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NATURAL GAS UTILIZATION ACT OF 1987

HEARING

BEFORE THE

SUBCOMMITTEE ON ENERGY REGULATION
AND CONSERVATION

OF THE

COMMITTEE ON
ENERGY AND NATURAL RESOURCES
UNITED STATES SENATE

ONE HUNDREDTH CONGRESS

FIRST SESSION

ON

S. 85

A BILL TO AMEND THE POWERPLANT AND INDUSTRIAL FUEL USE ACT OF 1978 TO REPEAL THE END USE CONSTRAINTS ON NATURAL GAS, AND TO AMEND THE NATURAL GAS POLICY ACT OF 1978 TO REPEAL THE INCREMENTAL PRICING REQUIREMENTS

MARCH 12, 1987

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S311-41

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J. Bennett Johnston and James A. McClure are Ex Officio Members of the Subcommittee
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NATURAL GAS UTILIZATION ACT OF 1987

THURSDAY, MARCH 12, 1987

U.S. SENATE,
SUBCOMMITTEE ON ENERGY
REGULATION AND CONSERVATION,
COMMITTEE ON ENERGY AND NATURAL RESOURCES,
Washington, DC.

The subcommittee met, pursuant to notice, at 9:43 a.m., in room SD-366, Dirksen Senate Office Building, Hon. Howard M. Metzenbaum, presiding.

OPENING STATEMENT OF HON. HOWARD M. METZENBAUM, A U.S. SENATOR FROM THE STATE OF OHIO

Senator METZENBAUM. The Committee will come to order.

Good morning. The Chair apologizes for starting a little bit late.

The purpose of this hearing is to consider S. 85, which repeals the restrictions on natural gas use contained in the Powerplant and Industrial Fuel Use Act, and the incremental pricing provisions of the Natural Gas Policy Act.

I am frank to say that I have serious reservations about this proposal. I am concerned it will cost Ohio miners their jobs and Ohio consumers their hard-earned dollars, but I am also worried about our Nation's energy security.

The bill does not promote our Nation's energy security, and it certainly does not protect those high priority users who are totally dependent on natural gas: residential consumers, process gas users, fertilizer manufacturers, agricultural interests, and small businesses.

I thought we had learned the dangers of overdependence on oil and gas supplies. Have we forgotten the disruptions and agony of the 1970's when factories and schools were closed, hospital gas supplies were threatened, and residential consumers' bills soared?

I remember how Congress desperately groped for any means to replace oil and gas with more plentiful and secure energy supplies. Do we really doubt that those days could actually return?

Everyone agrees the "gas bubble" will soon disappear.

If we repeal the restrictions on natural gas use, where will the gas supplies come from? Who will ensure adequate supplies for priority users and protect residential consumers from skyrocketing price increases? Will we turn to our neighbor to the north when we have dissipated our own resources here in this country?

Domestic gas reserves are declining, and the situation is not likely to improve. For the last ten years, production has exceeded new discoveries. Discoveries in 1985 were the lowest ever reported to the EIA. We have fewer proven reserves now than when the Fuel Use Act was passed.

In light of this, how many utility executives could honestly tell a public utility commission that they have an assured 20-year supply of gas? How many commissions would believe them, if they did?

As usual, it would be the small consumers who will suffer the consequences of any shortages. Changes in regulatory policy and marketing practices have so reduced the amount of gas subject to FERC curtailment authority that today there may not be even enough to assure adequate supplies to the highest priority users in the Nation.

In the event of shortages, there is no way to guarantee that residential and small commercial users will have the gas they need.

As a practical matter, the Act has not been a significant impediment to gas use by industries or utilities. It provides for waivers of gas use restrictions, and despite shrinking reserves not one of 411 waiver requests has been rejected outright by DOE.

Powerplant waivers granted and pending represent an increase in gas demand of 800 billion cubic feet per year. In light of DOE's cavalier approach to waivers, it may be more appropriate to hold a hearing on that agency's failure to responsibly enforce the law, rather than this hearing on repeal.

A premium fuel which is diminishing should be saved for the highest priority users. We should not gamble with their welfare and our Nation's economy. I hope that today's hearing will help us identify and better understand the key elements of this debate.

There are some strong feelings on this particular issue, and it would appear that if we continue down the road that is presently envisioned there will be one donnybrook of a battle before this matter gets through the United States Senate.

Senator **FORD**. Amen.

Senator **METZENBAUM**. There are signs and indications that some would like to compromise the issue. I do not know if that is possible. I am not certain that it is. Suffice it to say the Chair's door will be open, and I will be willing to explore the possibility of compromise, but I am frankly not too optimistic.

[The text of S. 85 follows:]

100TH CONGRESS
1ST SESSION

S. 85

To amend the Powerplant and Industrial Fuel Use Act of 1978 to repeal the end use constraints on natural gas, and to amend the Natural Gas Policy Act of 1978 to repeal the incremental pricing requirements.

IN THE SENATE OF THE UNITED STATES

JANUARY 6, 1987

Mr. JOHNSTON (for himself, Mr. BINGAMAN, Mr. BREAUX, and Mr. DOMENICI) introduced the following bill; which was read twice and referred to the Committee on Energy and Natural Resources

---

A BILL

To amend the Powerplant and Industrial Fuel Use Act of 1978 to repeal the end use constraints on natural gas, and to amend the Natural Gas Policy Act of 1978 to repeal the incremental pricing requirements.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. (a) SHORT TITLE.—This Act may be referred to as the "Natural Gas Utilization Act of 1987".

(b) TABLE OF CONTENTS.—

TABLE OF CONTENTS

Sec. 1. Short title; table of contents.
Sec. 2. Repeal of certain sections of the Powerplant and Industrial Fuel Use Act of 1978.
Sec. 3. Conforming amendments.

Sec. 4. Repeal of incremental pricing requirements.
Sec. 5. Effective date.

REPEAL OF CERTAIN SECTIONS OF THE POWERPLANT AND INDUSTRIAL FUEL USE ACT OF 1978

SEC. 2. (a) The following sections of the Powerplant and Industrial Fuel Use Act of 1978 (42 U.S.C. 8301 et seq.) are repealed:

(1) sections 103 (a)(16), (a)(18), (a)(19), and (a)(29)—(42 U.S.C. 8302 (a)(16), (a)(18), (a)(19), and (a)(29));

(2) sections 201 and 202 (42 U.S.C. 8311 and 8312);

(3) section 302 (42 U.S.C. 8342);

(4) section 401 (42 U.S.C. 8371);

(5) section 402 (42 U.S.C. 8372); and

(6) section 405 (42 U.S.C. 8375).

(b) The table of contents of the Powerplant and Industrial Fuel Use Act of 1978 is amended by striking the items relating to the sections repealed by subsection (a) of this section.

CONFORMING AMENDMENTS

SEC. 3. (a) Section 102 of the Powerplant and Industrial Fuel Use Act of 1978 (42 U.S.C. 8301) is amended by striking "and major fuel-burning intallations" and "and new" wherever these phrases appear.

(b) Section 103 of the Powerplant and Industrial Fuel Use Act of 1978 (42 U.S.C. 8302) is amended—

(1) in subsection (a)(13)(B), by—

(A) striking clause (ii)(III);

(B) striking "; or" at the end of clause (ii)(II), and inserting a period in its place; and

(C) inserting "and" at the end of clause (ii)(I);

(2) in subsection (a)(15), by striking "or major fuel-burning installation" and "or new" wherever these phrases appear;

(3) in subsection (a)(20), by striking "or major fuel-burning installation";

(4) by redesignating subsections (a)(17), (a)(20), (a)(21), (a)(22), (a)(23), (a)(24), (a)(25), (a)(26), (a)(27), and (a)(28) as subsections (a)(16), (a)(17), (a)(18), (a)(19), (a)(20), (a)(21), (a)(22), (a)(23), (a)(24), and (a)(25);

(5) in subsection (b), by striking "or major fuel-burning installation" wherever this phrase appears;

(6) in subsection (b)(1)(D), by striking everything after "synthetic gas involved" and inserting in its place a period; and

(7) by striking subsection (b)(3), and redesignating subsection (b)(4) as subsection (b)(3).

(c) Section 104 of the Powerplant and Industrial Fuel Use Act of 1978 (42 U.S.C. 8303) is amended to read as follows:

"The provisions of the Act shall apply in all the States, Puerto Rico, and the territories and possessions of the United States, except Hawaii and Alaska.".

(d) Section 303 of the Powerplant and Industrial Fuel Use Act of 1978 (42 U.S.C. 8343) is amended—

(1) by striking "or installation" and "or installations" wherever the phrases appear;

(2) by striking "or 302" wherever the phrase appears;

(3) by striking subsection (a)(3);

(4) by amending subsection (b)(1) to read as follows:

"(1) The Secretary may prohibit, by rule, the use of natural gas or petroleum under section 301(b) in existing electric powerplants.";

(5) in subsection (b)(3), by striking "or major fuel-burning installation"; and

(6) by amending the last sentence of subsection (b)(3) to read as follows: "Any such rules shall not apply in the case of any existing electric powerplant with respect to which a comparable prohibition was issued by order.".

(e) Section 403 of the Powerplant and Industrial Fuel Use Act of 1978 (42 U.S.C. 8373) is amended by striking——

(1) in subsection (a)(1), "major fuel-burning installation, or other unit" and the comma immediately preceding this phrase and "installation, or unit" and the comma immediately preceding this phrase;

(2) in subsection (a)(2), "installation, or other unit" and the comma immediately preceding that phrase, and "installation, or unit" and the comma immediately preceding that phrase;

(3) in subsection (a)(2), the last sentence; and

(4) subsection (a)(3).

(f) Section 404 of the Powerplant and Industrial Fuel Use Act of 1978 (42 U.S.C. 8374) is amended by striking—

(1) in subsection (c), "new or" in the phrase "applicable to any new or existing electric powerplant"; and

(2) subsection (g).

(g) Section 701 of the Powerplant and Industrial Fuel Use Act of 1978 (42 U.S.C. 8411) is amended by striking—

(1) in the last sentence of subsection (b), "or installation";

(2) subsection (c);

(3) in the title of subsection (d), "And Exemptions";

(4) in the first sentence of subsection (d)(1), "or any petition for any order granting an exemption (or permit";

(5) in subsection (d)(1)(B), "or in the consideration of such petition,";

(6) in subsection (f), "or a petition for an exemption (or permit) under this Act (other than under section 402 or 404),"; and

(7) subsection (g).

(h) Section 702 of the Powerplant and Industrial Fuel Use Act of 1978 (42 U.S.C. 8412) is amended by striking—

(1) in the title of subsection (a), "Or Exemption";

(2) in subsection (a), "or granting an exemption (or permit)";

(3) subsection (b), and redesignating subsection (c) as subsection (b);

(4) in the first sentence of subsection (b)(1) (as redesignated), "or by the denial of a petition for an order granting an exemption (or permit) referred to in subsection (b),";

(5) in the first sentence of subsection (b)(1) (as redesignated), "such rule, order, or denial is published

under subsection (a) or (b)" and inserting in its place "such rule, or order is published under subsection (a)";

(6) in the first sentence of subsection (b)(2) (as redesignated), "the rule, order, or denial" and inserting in its place "the rule or order";

(7) in the second sentence of subsection (b)(2) (as redesignated), "(or denial thereof)"; and

(8) in subsection (b)(3) (as redesignated), "any such rule, order, or denial" and inserting in its place "any such rule or order".

(i) Section 711 of the Powerplant and Industrial Fuel Use Act of 1978 (42 U.S.C. 8421) is amended by striking in the first sentence of subsection (a), "or a major fuel-burning installation".

(j) Section 721 of the Powerplant and Industrial Fuel Use Act of 1978 (42 U.S.C. 8431) is amended by striking subsection (c) and redesignating subsection (d) as subsection (c).

(k) Section 723 of the Powerplant and Industrial Fuel Use Act of 1978 (42 U.S.C. 8433) is amended by striking subsection (b) and redesignating subsections (c) and (d) as subsections (b) and (c).

(l) Section 731 of the Powerplant and Industrial Fuel Use Act of 1978 (42 U.S.C. 8441) is amended by striking—

(1) "or major fuel-burning installation" wherever the phrase appears; and

(2) "title II or" in subsections (a)(1) and (g)(3).

(m) Section 745 of the Powerplant and Industrial Fuel Use Act of 1978 (42 U.S.C. 8455) is amended by striking in the first sentence of subsection (a), "from new and existing electric powerplants and major fuel-burning installations" and inserting in its place "from existing electric powerplants".

(n) Section 761 of the Powerplant and Industrial Fuel Use Act of 1978 (42 U.S.C. 8471) is amended by striking—

(1) in subsection (a), "any existing or new electric powerplant or major fuel-burning installation" and inserting in its place "any existing electric powerplant"; and

(2) in subsection (b)—

(A) "new or" in the phrase "In the case of any new or existing facility"; and

(B) "except to the extent provided under section 212(b) or section 312(b)" and the comma immediately preceding that phrase.

REPEAL OF INCREMENTAL PRICING REQUIREMENTS

SEC. 4. (a) Subject to subsections (b) and (c) of this section, title II of the Natural Gas Policy Act of 1978 (15

U.S.C. 3341–3348) is repealed, and the items relating to title II are striken from the table of contents of that Act.

(b) A rule promulgated by the Commission under title II of the Natural Gas Policy Act of 1978 shall continue in effect only with respect to the flowthrough of costs incurred before the enactment of this section, including any surcharges based on such costs.

(c) The Commission may take appropriate action to implement this section.

EFFECTIVE DATE

SEC. 5. The provisions of this Act shall take effect on the date of enactment.

Senator METZENBAUM. We have a number of distinguished members with us this morning, and I will call upon the ranking minority member first, and then the chairman of the committee, although I am not certain what protocol calls for, but I guess he will go along with that.

Senator Nickles.

STATEMENT OF HON. DON NICKLES, A U.S. SENATOR FROM THE STATE OF OKLAHOMA

Senator NICKLES. Thank you, Mr. Chairman.

I want to thank you for holding the hearing today. I strongly support this legislation and am pleased to be a co-sponsor of it. I compliment Senator Johnston, Senator Domenici, and others on this Committee, and Senator McClure, who have fought for repeal of the Fuel Use Act. I think it is vitally important that we do so.

In the last several years I think we have made some progress, and it was primarily in the amendments that we made in 1981 to the Fuel Use Act. We should have gone further since that time to repeal this Act.

As you know, we have had legislation proposed before this Committee. It has always been wrapped up either as an individual bill which I have introduced or co-sponsored, or in more comprehensive legislation. I hope that we can do more comprehensive legislation this year, and I have introduced legislation that would do that. The Administration still has a bill, as well, that I think is a good step in the right direction, but I also think it is important to do what we can do and do it now.

This industry desperately needs some good signals and some good news. This industry is hurting. When I say "this industry," I am talking about the natural gas industry and the oil industry as well. Repeal of end-use artificial restraints of the Fuel Use Act is long overdue. By repeal, we would be allowing the marketplace to be making decisions on which fuel they should use, whether that fuel should be coal, or whether it be natural gas, or some other, oil fuel, whatever.

We should, in my opinion, allow the marketplace to be making that decision instead of Congressmen and Senators arbitrarily saying that we are going to make restrictions on end-use sales. I think, again, let us allow the experts to make those decisions.

I look forward to hearing our panelists today. You have an outstanding group of witnesses, many of which we have had before this Committee on several times to give their positions. I also look forward to hearing their comments. You mentioned the possibilities of compromise. I am hopeful that we will find out what those compromises mean, and I also hope when we hear the word "compatibility" or "capability" that we will find out how much that would cost.

I think it would not make a lot of sense to repeal it, but yet require those utilities to spend an inordinate amount of money to meet some arbitrary definitions that we would come up with in Congress.

So I hope we will move forward on repeal in an expedited manner. I think it is long overdue.

Senator **Metzenbaum**. Thank you, Senator Nickles.

Senator Johnston.

STATEMENT OF HON. J. BENNETT JOHNSTON, A U.S. SENATOR FROM THE STATE OF LOUISIANA

The **Chairman**. Thank you, Mr. Chairman.

The Fuel Use Act is a quaint anachronism harkening back to a former day when we thought we could regulate our way out of energy shortages and dictate to the market what the highest and best use of a fuel is. That is rubbish. It is hogwash. What it produces is exactly what the Fuel Use Act is producing today; that is, more shortages.

Just as the Natural Gas Act of 1978 produced the shortages that led to the problems we had in 1978, so the Fuel Use Act, by restricting the use of natural gas artificially and improperly, is producing shortages today. The shortages have not yet shown up in natural gas because indeed there is a surplus at this time, but the lack of drilling in both oil and gas is one of the results of the Fuel Use Act.

The markets have fundamentally changed since the time that we passed this Act. First of all, there is this lingering surplus of natural gas. It cannot be sold. Consequently, the price is too low to allow for further drilling.

Secondly, there has been a switch from natural gas to coal and other fuels, about 3 trillion cubic feet of natural gas, so that the market is much more restricted than it was.

And finally, there is in fact a dual-fuel capability of about 40 percent of the industrial load. Our witnesses testified yesterday that the shutdowns of industry that occurred in the cold winter of 1976–1977 would not occur today; if gas got short they would simply switch to fuel oil or some other fuel—40 percent of the industrial load is a tremendous amount and enough of a switching capability to handle any possible shortage.

So, Mr. Chairman, this bill ought to be passed. This Act ought to be repealed, and quickly, and I hope we will do just that. We explored last year and in the last Congress the question of compromise, and frankly I do not think there is any way to draw so-called "coal capable" language that means anything that will satisfy either us or those who wish to artificially restrain the use of natural gas.

By putting on language that says you have to be coal capable, you simply kill the bill, because you make it so expensive to burn natural gas that nobody would burn it. So let us not kid ourselves. Either you are for or you are against the repeal of the Fuel Use Act.

I am strongly for that repeal. I do not think there is any way we can compromise it. I would also hope, Mr. Chairman, that we will keep the bill clean and that we will pass it quickly. I think the House is ready for it. I think the Senate is ready for it, and I know we will probably have a spirited debate here and on the Floor as well. That is the great American tradition. That is the great Metzenbaum tradition. We enjoy our debates.

[Laughter.]

The **CHAIRMAN**. The Metzenbaum-Ford tradition, but we enjoy our debates——

Senator **FORD**. Be careful how you describe "hogwash" and "rubbish." [Laughter.]

Senator **METZENBAUM**. I am glad that you enjoy the debate. We will give you an opportunity to have a lot of enjoyment.

The **CHAIRMAN**. Well, thank you very much, Mr. Chairman.

Senator **METZENBAUM**. Thank you.

Senator McClure.

STATEMENT OF HON. JAMES A. McCLURE, A U.S. SENATOR FROM THE STATE OF IDAHO

Senator **McCLURE**. Mr. Chairman, while I strongly support the enactment of S. 85, I want to take just a moment to express one or two other concerns—and I do strongly support the enactment of S. 85. It is essentially identical to provisions in S. 1715 as reported by this Committee in the 98th Congress.

The Fuel Use Act is one of five statutes commonly referred to as the National Energy Act. These statutes were enacted as a package, and repeal of any one of them must be reviewed for its effect on the others. The correction of one distortion of the marketplace may lead to creation of another by the remaining statutes.

At the time that they were enacted, the American consumer still remembered the effects of the 1973 oil embargo, as well as the effects of natural gas curtailments. Against that background, the Congress enacted the Fuel Use Act to reduce the vulnerability of the United States to energy supply interruptions by conserving natural gas and petroleum for uses other than electric utility or other industrial or commercial generation of steam or electricity for which there are no feasible alternatives by encouraging the use of coal.

While I understand and, in part, agree with the basic objective of the statute, I do not believe that it is appropriate for the Federal Government to dictate the fuel of choice to be used by electric power plants and major industrial facilities. As such, the Act represents an unprecedented and inappropriate intrusion into the marketplace by government.

Thus, I support repeal of the Fuel Use Act. The natural gas picture today is not what it was perceived then to be, and perhaps then it was not even what we perceived it to be. Nevertheless, I do believe that electric utilities should be encouraged to use other than natural gas and petroleum for baseload electric power generation.

Further, I believe they should be encouraged to maintain a dual-fuel capability in the event that there are future curtailments of either natural gas or petroleum supplies. As yesterday's hearing on the world oil outlook highlighted, maintenance of such a dual-fuel capability is particularly important when a utility relies on imported petroleum supplies. I am not certain what those means should be, or indeed whether we can find such means that are neutral or relatively neutral in the marketplace, but I think we ought to look.

Unfortunately, in 1973 many electric utilities did not possess such a dual-fuel capability which made the effects of the embargo worse than they otherwise should be. We should try to find ways to avoid losing the fuel flexibility that we have acquired in the intervening years and avoid a return to the situation that then existed.

I want to underscore that I am in favor of the enactment of S. 85. I do not wish to hold it up in any fashion as we look at the other questions that are related to that question.

Thank you, Mr. Chairman.

Senator METZENBAUM. Thank you, Senator McClure.

Senator Ford.

STATEMENT OF HON. WENDELL H. FORD, A U.S. SENATOR FROM THE STATE OF KENTUCKY

Senator FORD. Thank you, Mr. Chairman.

I thank you particularly for allowing me to participate in this hearing today since I am not a member of this subcommittee.

As you and other members of the subcommittee know, I have had a long-standing interest in the subject that we are addressing today, and I am grateful for the opportunity to hear the witnesses.

Many of us sat on this Committee when the Fuel Use Act came into being, and I hope we do not completely lose sight of the energy circumstances against which it was enacted nine years ago. Thankfully, most of the worst of those circumstances—the shortages, curtailments, and steep price increases of the 1977-1978 period—are no longer with us. However, one basic policy element is as valid today as it was then: By and large, our most precious energy resources should be reserved for the highest valued uses, and our lesser value, more abundant fuels should be reserved for basic energy production.

In simple terms, Mr. Chairman, this means that we should try to reserve our domestic oil and natural gas resources for use in the residential, commercial, industrial, and transportation sectors where there are few substitutes, and use coal to the extent practicable for the production of electricity. A comparative look at our long-term domestic supplies of these resources make that simple logic, I think, hard to refute.

My State is the Nation's largest producer of coal. We do not produce a lot of natural gas. We are a consuming State. Yet, there are energy demands in my State which can only be met by natural gas. I want to be certain that the homes, shops, schools, and factories in my State that depend upon natural gas will always have ample supplies of that previous fuels.

I do not want to see hundreds of thousands of workers in this country lose their jobs because of a shortage of natural gas. One of the questions I hope we can address during markup of this legislation is how and whether current curtailment policies will work in today's gas market, and that is a part of the legislation, Mr. Chairman, that I will focus on a great deal later.

With a declining percentage of gas deliveries coming from pipeline-owned gas and an apparent desire to increase gas consumption in the utility market, we may find ourselves faced with some unhappy choices and no effective policy for dealing with shortages. I intend to discuss this question, as I said, further and fully at the Committee markup.

In the meantime, I would like the Chairman to know that I intend to offer an amendment to S. 85 which is compatible with the basic intent of the bill, I believe, but which nevertheless attempts to provide some insurance to both the gas users and the electricity consumers of my State.

My amendment would let market forces allocate fuel in the utility market, but it would also assure that any large-scale commitment to the use of natural gas for the production of electricity would not be irrevocable at least from a technological standpoint.

My amendment does not say that new baseload power plants must be coal capable at the outset. It suggests only that new baseload electric generating capacity should not be designed so that it could never be coal capable. We want to assure that in the event we are faced with another energy crunch that electricity consumers are not stuck with very high utility bills simply because powerplants cannot be converted technologically to lower fuel costs.

Among the many energy lessons of the 1970s is one that urges fuel use flexibility and the avoidance of irreversible commitments to relatively scarce fuel. And I will prove, I think before this hearing is over, that they are scarce. I will have more to say about my amendment later as we approach markup.

Mr. Chairman, I again thank you for the opportunity of being here today, and I look forward to working with you on this legislation.

Senator METZENBAUM. We are pleased to have you work with us, Senator Ford, and are glad to welcome you.

The Chair knows that a number of the Members of the Committee who are not Members of the subcommittee have a strong interest in this legislation, and has not seen fit to restrict in any way their participation in the debate.

Senator Hecht, we are happy to welcome you for such comments as you may have.

STATEMENT OF HON. CHIC HECHT, A U.S. SENATOR FROM THE STATE OF NEVADA

Senator HECHT. Thank you very much, Mr. Chairman. Also I appreciate the fact, not being on the subcommittee, I can come here and give a short statement.

As a Member of the Committee on Energy and Natural Resources, I am pleased to welcome the witnesses here today to talk about the repeal of the restrictions on using natural gas as fuel for most new electric generating plants and industrial boilers.

I have joined our Committee Chairman and Senator Domenici as a co-sponsor of this bill because I believe the time has come for us to remove these limitations on the oil and gas and utility industries.

I support encouraging our domestic oil and gas industry, which is unduly hampered by statutory market restraints like those in the Act, being amended here.

At a time when our energy imports are rising, and along with it the continued threat to the energy security, we must do what we can to foster an atmosphere favorable to the development and use of our own resources.

Looking at today's gas supplies and the positive outlook for future supplies, repeal of the prohibitions on use of gas as fuel makes sense. We should not artificially narrow the fuel use options available to an industry that serves the public, and we should not restrict the opportunity for the oil and gas industry to sell its products.

The name of the game here is free choice—let us create an arena where the choices are not dictated by law, but are the rightful responsibility of the private sector. The repeal of these provisions of the Fuel Use Act and Natural Gas Policy Act will accomplish this.

Mr. Chairman, I am glad you are holding this hearing today, and I look forward to prompt action by the full Energy Committee so we can bring this legislation before the Senate.

Thank you very much.

Senator METZENBAUM. Thank you, Senator Hecht.

Senator Bingaman.

STATEMENT OF HON. JEFF BINGAMAN, A U.S. SENATOR FROM THE STATE OF NEW MEXICO

Senator BINGAMAN. Thank you, Mr. Chairman.

I do have a statement that I will just put in the record in the interests of time. I am a co-sponsor of S. 85. I strongly support that bill and the repeal of the Fuel Use Act, and I am glad you are holding this hearing.

[The prepared statement of Senator Bingaman follows:]

STATEMENT BY SENATOR JEFF BINGAMAN
HEARING ON S. 85
March 12, 1987

I thank the Chairman of the Subcommittee on Energy Regulation and Conservation for holding this hearing on S. 85, legislation to repeal the Power Plant and Industrial Fuel Use Act of 1978, and the Incremental Pricing System. The repeal of the Fuel Use Act is long overdue. The Act currently prohibits the burning of oil and gas in new power plants and bars the building of plants without alternate fuel capacity. These restrictions seem to make little sense in light of today's gas surplus and low oil prices. The Incremental Pricing System also needs to be replaced. Under incremental pricing, "low priority users," such as fuel switchable industries, must pay the highest share of a pipeline's gas purchase costs. This system is no longer necessary.

The Fuel Use Act of 1978, by imposing restrictions on the use of oil and natural gas to fuel industrial or utility boilers, reduced the demand for natural gas, which was then a vastly underpriced commodity. Years of regulation had kept the price of natural gas low in relation to other fuels, which artificially stimulated the demand for natural gas, especially among residential users. This situation did nothing, however, to encourage exploration, drilling and production of natural gas.

As a result of the passage of the Fuel Use Act, large volume consumers of natural gas shifted to alternative energy sources such as coal. This action improved supplies of natural gas so much that in 1981 the provisions in the Act prohibiting the use of natural gas in existing power plants and utilities was repealed. New plants, however, are still prevented from using oil or natural gas. Now, at a time of soaring surpluses of oil and gas -- which historically, because of its competitive market price, has been the target of the Fuel Use Act -- is the time to repeal the prohibitions on the use of both natural gas and oil. This restriction has inhibited market forces by dictating fuel choices for utilities and industrial users. We should now return the choice to market-place forces.

This is part of a long-term effort that will help relieve the strain imposed on the energy-producing states by the current oil price decline and the resultant over-supply. There will be other legislation to provide more direct and immediate relief to the energy industry and protection for our national security interests, but this is an important first step to ensure that our domestic producers stay in the business of finding and producing oil and natural gas.

I look forward to the testimony of our witnesses.

Senator **Metzenbaum**. Thank you, Senator Bingaman.

Senator Domenici.

STATEMENT OF HON. PETE V. DOMENICI, A U.S. SENATOR FROM THE STATE OF NEW MEXICO

Senator **Domenici**. I have no statement, Mr. Chairman, other than I thank you for holding the hearing. I hope you will give us a chance to vote on this measure expeditiously, and that we get a chance to have the United States Senate vote on it quickly.

Thank you very much.

Senator **Metzenbaum**. Thank you, Senator Domenici.

As our first panel, I am happy to welcome our fellow Senator, Senator John Heinz of Pennsylvania, and Tom Chema—you can come to the table at the same time—Chairman of the Public Utilities Commission of Ohio. I am particularly pleased to welcome him both as a friend and as the Chairman of the Public Utilities Commission of Ohio.

We are trying to limit statements of everyone to five minutes. Senators, I suppose, have some exception.

Senator **Heinz**. Do not encourage us, Mr. Chairman.

Senator **Metzenbaum**. You might get up to six before we cut you off, but not much more.

[Laughter.]

Senator **Metzenbaum**. We are happy to have you, Senator Heinz.

STATEMENT OF HON. JOHN HEINZ, A U.S. SENATOR FROM THE STATE OF PENNSYLVANIA

Senator **Heinz**. Mr. Chairman, thank you, and Members of the Committee. It is good to be back before the Energy Committee. I served on it for a number of years with great pleasure.

I also thank you for holding this hearing on S. 85, and I am glad to have the opportunity to testify. Let me say I am here not only because I believe that S. 85 is bad energy policy, it is legislation that would catastrophically add to unemployment in an industry, the coal industry, where unemployment rolls are already at depression levels and, at the same time, it would guarantee backbreaking cost increases to consumers all across this country.

S. 85, as has been pointed out, would repeal what remains of the 1978 Powerplant and Industrial Fuel Use Act. Only the Act's provisions which facilitate voluntary fuel conversion would remain. The most burdensome provisions of the Fuel Use Act are those which would have forced conversion from oil and gas to coal by 1991 were repealed in 1981.

Repeal of the Fuel Use Act is thus not a new issue for most of us. Last year Senator Gramm tried to put together a compromise on this issue, a compromise which would have required power plants to be designed such that future voluntary conversion to coal use would not be precluded.

I might add, I am rather disappointed to note that the representatives of the gas lobby have apparently abandoned and totally repudiated any and all compromise on this issue. I consider that attitude to be simply a greedy grab for market share at the expense of coal by an industry already twice the share and size of coal.

Now, Mr. Chairman, I consider myself a supporter of the gas industry. Indeed, I seem to recollect in 1978 that I voted time and again to break a filibuster that the chairman of this subcommittee was mounting against the decontrol of natural gas but, Mr. Chairman, this time I am on your side. If there is going to be a filibuster, I am going to be on your side.

I am also here to tell you, and to emphasize, that no elite lobby is going to throw its weight around here on Capitol Hill; that that simply is not going to work. We are not going to be bullied into bad energy policy that undermines our Nation's energy future.

Now the fact of the matter is that the gas bubble, which is the temporary oversupply of natural gas deliverability, is going to burst. The repeal of the Fuel Use Act in S. 85 will alter planning for power plants which will not come on line until the 1990s and near the next century. To encourage long-term energy use on the short-run phenomenon of the gas bubble is not only totally irresponsible, it is to invite energy disaster.

As the chairman knows well, a coal-fired power plant can be readily converted from coal to oil or natural gas, but a gas or oil-fired facility cannot be converted to coal unless it is designed for that purpose. Repeal of the Fuel Use Act thus strangles this Nation's energy options and promotes the use of our least abundant fuels.

Yesterday, Michael Buckner of the United Mine Workers testified, and I quote, "The U.S. has a demonstrated coal reserve base of 478 billion tons. Even at minimal recovery rates, our coal reserves will last for the next 250 years. With current technology, new power plants burn coal in an extremely clean manner."

How does that compare to natural gas? Well, here is what the Department of Energy's annual energy outlook for 1985 had to say. It predicted the total U.S. gas reserves are expected to be 30 trillion cubic feet lower in 1995 than in 1985. In other words, proven natural gas reserves will barely last into the next century before they are exhausted. At the same time, consumption is expected to vastly outstrip the development of additional reserves.

Mr. Chairman, we learn few lessons from history around here, I fear, very few. The natural gas shortages of the 1970s should be a lesson for us, and yet we seem intent on creating another energy emergency for the many because of the self-interests of a few.

So for that reason, Mr. Chairman, I urge rejection of S. 85 and ask that the balance of my statement be included in the record at this point.

Senator METZENBAUM. Without objection, it will be included in the record.

[The prepared statement of Senator Heinz follows:]

TESTIMONY OF SENATOR JOHN HEINZ
REPEAL OF FUEL USE ACT
SUBCOMMITTEE ON ENERGY REGULATION
March 12, 1987

Mr. Chairman, I want to thank you for holding this hearing and I am very pleased to have this opportunity to testify.

The legislation before this Subcommittee, S. 85, would repeal what remains of the 1978 Powerplant and Industrial Fuel Use Act. Only the act's provisions which facilitate **voluntary** fuel conversion would remain. The most burdensome provisions of the Fuel Use Act, those which would have forced conversion from oil and gas to coal by 1991, were repealed in 1981.

Repeal of the fuel use act is thus not a new issue for us. Last year Senator Gramm tried to put together a compromise on this issue, a compromise which would have required powerplants to be designed such that future voluntary conversion to coal use would not be precluded. I am very disappointed to note that

Representatives of the gas industry have apparently abandoned any and all compromise on this issue. I consider this attitude to be a simple grab for market share at the expense of coal. Unless and until this attitude changes, I will be among those opposing any Senate consideration of S. 85 or any other legislation to amend the Fuel Use Act.

The fact of this matter is that the "gas bubble" -- the temporary surplus of natural gas deliverability -- is going to burst. Repeal of the Fuel Use Act will alter planning for powerplants which will not come on line until the 1990s and into the next century. To encourage long-term energy use on the short-run phenomenon of the gas bubble, is to invite disaster. As the Chairman knows well, a coal-fired powerplant can be readily converted from coal to oil or natural gas, but a gas or oil-fired facility cannot be converted to coal unless it is designed to do so.

Repeal of the Fuel Use Act thus limits this Nation's energy options, and encourages the use of our least abundent fuels. Yesterday, Michael Buckner of the United Mine Workers testified that "the U.S. has a demonstrated coal reserve base of 478 billion tons. Even at minimal recovery rates, our coal reserves will last for the next 250 years. With current technology, new power plants burn coal in an extremely clean manner."

This compares with the Department of Energy's Annual Energy Outlook for 1985, which predicts that total U.S. gas reserves are expected be 30 trillion cubic feet lower in 1995 than in 1985.

Proven natural gas reserves will barely last into the next century before they are exhausted. At the same time, production is expected to vastly outstrip additional reserves.

We learn few lessons from history around here. The natural gas shortages of the 1970s should be a lesson to us -- dependence on insecure energy resources must be avoided. The Fuel Use Act is but a remnant of an energy policy which sought to move the Nation to energy independence. It must no be thrown out wholesale.

For that reason I urge the rejection of S. 85.

Mr. Chairman, I would add only one important caveat. Among the key elements of the Fuel Use Act is the exemption for cogeneration facilities, which must be retained. Cogeneration represents a significant energy savings for this Nation, and provides cost savings as well. I hope the Chairman will support a strong exemption for congeneration -- which provides energy-intensive businesses and industries with the lowered costs they need to be competitive.

Senator HEINZ. Mr. Chairman, I would ask the indulgence of the Committee. I have to participate in a hearing on another bill of mine up in Banking. Unless there are questions, I would like to be excused.

Senator METZENBAUM. Do any Members of the Committee have any questions of Senator Heinz?

Senator FORD. I was just curious. Are you telling us you might filibuster this bill? I was not quite sure what you said.

[Laughter.]

Senator HEINZ. There is nothing I would not attempt to do, always of course within the Rules of the Senate, to impede the progress of what I consider in its present form to be bad and irresponsible legislation.

Senator FORD. I think that is forthright enough. Thank you.

[Laughter.]

The CHAIRMAN. Mr. Chairman?

Senator METZENBAUM. Senator Johnston.

The CHAIRMAN. Mr. Chairman, I just want to tell the witness that the people in the coal lobby are my good friends, and I do not like to hear you talking about them like you were just a minute ago.

[Laughter.]

Senator HEINZ. Change in power is alive and well, even though Russell is gone.

Senator METZENBAUM. Are there any questions of Senator Heinz?

[No response.]

Senator METZENBAUM. If not, thank you, Senator Heinz.

Tom Chema, we are happy to welcome you. Again, I will repeat, we have a 5-minute rule.

STATEMENT OF THOMAS V. CHEMA, CHAIRMAN, PUBLIC UTILITIES COMMISSION OF OHIO

Mr. CHEMA. Mr. Chairman, Members of the Committee, my name is Thomas V. Chema.

I serve as Chairman of the Public Utilities Commission of Ohio. In that capacity, I represent the members of the Commission, and also energy consumers of Ohio. Thank you for allowing me this opportunity to present my views on this significant national energy policy issue.

Let me begin by stating that I am opposed to repeal of the Power Plant and Industrial Fuel Use Act. I am here to solicit your support for continuing the course of sound energy policy which we as a Nation have pursued these past eight years.

I oppose repeal because I think it is bad for the consumers of natural gas. The current deliverability surplus has had the effect of putting downward pressure on the price of natural gas. Though modest, these price declines are essential to the consumers of natural gas, both residential and industrial, particularly in the wake of the 1970s and early 1980s period of rate shock.

I oppose repeal because I think it bad policy to use a form of energy in a manner that is less than its highest and best use, and I oppose repeal because I think it is short-sighted economically.

Those in support of repeal are solely interested in reversing the impacts which a relatively open market have had on their industry. They seek a short-term fix to the perceived problem of lower prices, but have little or no concern for the long-term. That not only is bad energy policy and bad economics, but it is also bad for the pocketbooks of the people of Ohio and the people of our Nation.

For these reasons, I am opposed to the repeal of the Fuel Use Act. The Fuel Use Act was passed in the late 1970s at a time of gas shortage and skyrocketing energy prices. You and your predecessors believe that we were rapidly depleting our natural gas resources. Priorities for use of gas were established. Consumers were encouraged to conserve. Costs were high, and thermostats were turned down.

We now know that the shortages of the 1970s were in part artificially induced. Price controls had created an unattractive market for producers of natural gas relative to other fuels. So while gas was available underground, it was not available at the burner tip. However, with the advent of decontrol at the wellhead and price levels that reflected market pressures, gas producers began to produce because it again became profitable to do so.

Since 1979, there have been substantial increases in new additions to natural gas reserves. In fact, in the early 1980s we witnessed a drilling boom. Nearly 4000 rigs were operating in 1981. This represented more than a doubling of the rig count from the average of the 1970s. I would refer you to figure one of my testimony.

The result of this activity has brought not only the inevitable end to shortages, but has in fact brought a deliverability surplus. The freeing of market forces has worked. From a supply perspective, the policies of the recent past have been a success. It is important to note, however, that the price signals which sent drillers to their platforms in the Gulf of Mexico and the gas fields of Oklahoma and Texas, also sent consumers, both residential and industrial, running for cover.

In the energy market of the late 1970s and early 1980s, the only recourse was conservation for the residential consumer, and fuel switching and conservation for the industrial consumer. Conservation is generally thought to account for about a 10 percent reduction in natural gas usage since 1978. Thus, again it can accurately be stated that from a demand perspective market forces worked, and again it can be stated that your policies worked.

Today, however, the proponents of repeal would suggest that either the market does not work, or perhaps it works too well. They want to interfere with the market because, from their point of view, market forces are pushing in the wrong direction. I would suggest, however, that the downward pressure on price induced by today's surplus is not an evil to be avoided. Rather, it is an essential ingredient in even a partially free market such as that which exists with all forms of energy.

Today is a needed break for the consumers of natural gas. The dislocations caused by the rate shocks of the last decade have not as yet been fully absorbed by consumers either from an economic or a psychological viewpoint. This winter, a comparatively mild winter for Ohio, we have approximately 200,000 families who cannot pay their heating bills and would literally be out in the cold but for programs such as the percentage-of-income payment plan.

We have basic industry in Ohio that is just now beginning to overcome the impact of the early 1980s depression, and we have farmers in Ohio who have not yet overcome the downturn in the farm economy. Frankly, falling natural gas prices are helping each and every one of these categories of consumers to make it. That is good economics.

I fail to see either the wisdom or the necessity of interfering with market conditions by artificially dissipating the surplus. I say, let the consumer profit when the prices go down, for he will surely pay when the prices go up. The current surplus which is depressing gas prices, unlike the poor, will not always be with us. We are in fact using substantially more gas than we are adding to proven reserves.

The American Gas Association has suggested that during the 1980s additions to reserves averaged close to full replacement, the rate at which new reserve additions replace annual gas production. Whereas, during the decade prior to implementation of the NGPA, reserve additions in the lower 48 States averaged only 48 percent of replacement. The AGA is wrong both in its facts and in the implications it would have us draw from those facts.

Senator **METZENBAUM**. How much more do you have to finish, Tom?

Mr. **CHEMA**. Probably about three more minutes, Senator.

Senator **METZENBAUM**. I am afraid that if I give you three more minutes, everybody else has to get three more minutes, and I do not know how we are going to finish this morning anyhow. So I am going to just ask you to include the balance of your statement in the record.

Mr. **CHEMA**. Senator, you have copies of the testimony, and I appreciate very much the opportunity to be here and present this testimony before you.

Senator **METZENBAUM**. All of your statement will be included in the record.

[The prepared statement of Mr. Chema follows:]

TESTIMONY OF

THOMAS V. CHEMA, CHAIRMAN

PUBLIC UTILITIES COMMISSION OF OHIO

MARCH 12, 1987

TESTIMONY

Mr. Chairman, Members of the Committee, my name is Thomas V. Chema. I serve as Chairman of the Public Utilities Commission of Ohio. In that capacity, I represent the members of the Commission and also the energy consumers of Ohio. Thank you for allowing me this opportunity to present my views on this significant national energy policy issue.

Let me begin by stating that I am opposed to repeal of the Power Plant & Industrial Fuel Use Act. I am here to solicit your support for continuing the course of sound Energy Policy which we as a Nation have pursued these past 8 years.

I oppose repeal because I think it bad for the consumers of natural gas. The current deliverability surplus has had the effect of putting downward pressure on the price of natural gas. Though modest, these price declines are essential to the consumers of natural gas, both residential and industrial, particularly in the wake of the 1970's and early 1980's period of "rate shock".

I oppose repeal because I think it bad policy to use a form of energy in a manner that is less than its highest and best use.

And, I oppose repeal because I think it shortsighted economically. Those in support of repeal are solely interested in reversing the impacts which a relatively open market have had on their industry. They seek a short-term fix to the perceived "problem" of lower prices, but have little or no concern for the long-term. That not only is bad energy policy, and bad economics, but it is also bad for the pocketbooks of the people of Ohio and the people of our Nation. For these reasons, I am opposed to the repeal of the Fuel Use Act.

The Fuel Use Act was passed in the late 1970's at a time of gas shortage and skyrocketing energy prices. You, and your predecessors, believed that we were rapidly depleting our natural gas resources. Priorities for use of gas were established. Consumers were encouraged to conserve. Costs were high, and thermostats were turned down.

We now know that the shortages of the 1970's were, in part, artificially induced. Price controls had created an unattractive market for producers of natural gas relative to other fuels. So, while gas was available underground, it was not available at the burner tip. However, with the advent of decontrol at the wellhead and price levels that reflected market pressures, gas producers began to produce because it had again become profitable to do so. Since 1979, there have been substantial increases in new additions to natural gas reserves. In fact, in the early 1980's we witnessed a drilling boom. Nearly 4,000 rigs were operating in 1981; this represented more than a doubling of the rig count from the average of the 1970's (see figure 1).

The result of this activity has brought not only the inevitable end to shortages, but has in fact brought a deliverability surplus. The freeing of market forces has worked. From a supply perspective, the policies of the recent past have been a success.

It is important to note, however, that the price signals which sent drillers flocking to their platforms in the Gulf of Mexico and the gas fields of Oklahoma and Texas, also sent consumers--both residential and industrial--running for cover. In the energy market of the late 1970's and early 1980's, the only recourse was conservation for the residential consumer; and fuel-switching and conservation for the industrial consumer. Conservation is generally thought to account for about ten percent reduction in natural gas usage since 1978. Thus, again, it can accurately be stated that from a demand perspective, market forces worked. And again, it can be stated that your policies worked.

Today, however, the proponents of repeal would suggest that either the market does not work, or perhaps, it works too well! They want to interfere with the market because, from their point of view, market forces are pushing in the wrong direction. I would suggest, however, that the downward pressure on price, induced by today's surplus, is not an evil to be avoided. Rather, it is an essential ingredient in even a partially free market such as that which exists with all forms of energy. Today it is a needed break for the consumers of natural gas. The dislocations caused by the "rate shocks" of the last decade have not as yet been fully absorbed by consumers, either from an economic or from a psychological view point.

This winter--a comparatively mild winter for Ohio--we have approximately 200,000 families who cannot pay their heating bills and would be literally out in the cold but for programs such as the Percentage of Income Payment Plan. We have basic industry in Ohio that is just now beginning to overcome the impact of the early 1980's depression. And we have farmers in Ohio who have not yet overcome the downturn in the farm economy. Frankly, falling natural gas prices are helping each and every one of these categories of consumers to make it. That is good economics. I fail to see either the wisdom or the necessity of interfering with market conditions by artificially dissipating the surplus. I say, let the consumer profit when prices go down, for he will surely pay when prices go up.

The current surplus which is depressing gas prices, unlike the poor, will not always be with us.

We are, in fact, using substantially more gas than we are adding to proven reserves. The American Gas Association (AGA) has suggested that during the 1980's, additions to reserves averaged close to full replacement (the rate at which new reserve additions replace annual gas production), whereas during the decade prior to implementation of the NGPA, reserve additions in the lower 48 states averaged only 46% of replacement. The AGA is wrong, both in its facts and the implications it would have us draw from those facts.

Additions to known reserves during the last two years, 1985-86, in actuality, diminished dramatically, according to estimates by Houston's Joffree Corporation. As the attached chart (see Figure 2) demonstrates, in the past two years, we have replaced only 41% of what we have produced--a rate substantially lower than the averages of the 1970's.

Since 1981, the only year other than 1978 when additions to reserves actually exceeded production volumes, the trend line is downward and additions to reserves are rapidly diminishing. The implication of this trend, I believe, is obvious. The deliverability surplus will come to an end in the ordinary course. Thus, there is no need to adjust the Fuel Use Act to hasten the demise of the "bubble". Let the existing market work.

Just last week, the brokerage firm of Kidder, Peabody & Co., in an investment strategy report, stated:

> "The decline in drilling activity means that for the second year in a row, consumption of natural gas in the U.S. in 1986 far exceeded new discoveries. This suggests to our analysts that by the Winter of 1987/88 the so called 'gas bubble' of excessive delivery capacity should dissolve, with a resulting firming of natural gas prices."

Prices will inevitably rise as the equallibrium the market seeks occurs. This Nation's consumers of natural gas have a right to expect that the market will be allowed to operate: The producers and the pipeline companies have a duty to let it operate.

I believe that there is a second, and equally important reason for not amending the Fuel Use Act. Based upon our current scientific knowledge, I believe that we have no choice but to conclude that natural gas is a finite, non-renewable resource. Unless the experiment now going on in Scandinavia proves us wrong, current wisdom would suggest that there is only so much natural gas to be found. Not only is today's supply of reserves diminishing, but based upon most current geological surveys, the supply, which is as yet unproven, also is diminishing. Attached to my testimony as Figure 3 is a chart that graphically demonstrates the U.S. natural gas supply. I would note that this chart is the product of the Shell Oil Company.

The trend line, again, is moving downward. In the not too distant future, should we as a nation continue to consume at the rate which we have in the past, we may very well find ourselves in the midst of another shortage.

That which was sound energy policy in 1978, is still sound energy policy. There is no need to hasten the inevitable, to encourage the unnecessary consumption of an energy source. To do so is bad policy. To do so is shortsighted.

Since natural gas is a finite resource and our reserves are limited, we should not, in my view, be using natural gas for purposes for which there are equally good substitutes. Instead, we should tailor its use to that for which it is best suited--residential home heating and certain agricultural and commercial applications. To do otherwise risks gross misuse of a very valuable natural resource.

Clearly, there are alternative fuels for use in utility and industrial boilers. Both before and since the inception of the Fuel Use Act, we used coal and fuel oil for these applications. Moreover, we are developing technologies and exploring new ways to burn coal more cleanly. Continued utilization of alternative fuels in this manner tailors our energy supplies to fit our energy needs at the least cost given our limited reserves. It is not so clear that there are alternative fuels economically and environmentally available for use by residential consumers and for appropriate commercial purposes.

While I am certainly opposed to total repeal, I do not feel we should be opposed to using natural gas for certain industrial purposes. Specifically, co-firing with coal makes sense. By using natural gas in conjunction with coal to burn sulfer out of high-sulfer coal, we can not only protect the environment, but there is significant evidence to suggest that we can improve the operating efficiency of boilers. The Fuel Use Act does not prevent the use of natural gas for this type of "least" cost purpose.

Inherent in the Act is an exemption, or waiver process. Between 1979 and the end of 1984, requests were made covering over 7,000 megawatts of generating capacity. In 1985, approximately 7,200 megawatts of generating capacity requests were filed. And, in the first three months of 1986 alone, 9,000 megawatts were applied for. To the best of my knowledge, none of these requests were denied by the Department of Energy. Clearly, DOE is making allowances for these "least" cost technological advances. However, it is significant that an application must be filed and that the utility or industry seeking to use natural gas in its boilers must articulate its rationale. This delineation of reasons for gas being the "least cost" alternative is a positive step in the on-going development of an energy policy that makes true economic sense for our Nation. That process can look to long-term as well as to short-run costs and benefits. Preserving the waiver process in and of itself is important.

Finally, proponents of repeal would argue that the market is not totally free, but rather is restricted by the limitation on allowable gas use. This is, of course, true. But this restriction continues to make sense, as I outlined above, in the context of using resources for their highest and best use. There is, of course, another "limitation" on the "free market"--gas is tied to other fuels, most notably oil, and that market is clearly not free. It is the linkage to oil and the distortion of the oil market that we all, including the domestic gas industry, must come to grips with. Repealing the Fuel Use Act would have negligible significance on this issue.

Expanding markets for natural gas, is in the judgment of the Public Utilities Commission of Ohio an appropriate objective. In fact, this would in the long-run be beneficial to ratepayers as well as to shareholders of the gas utilities. While laudable, it should be achieved through promoting economic development and growth, not by manipulating the market which currently exists.

In summary, I believe that the Fuel Use Act should not be repealed or amended to eliminate the current restriction on use of natural gas as an industrial and utility boiler fuel. The surplus of natural gas should be extended as long as possible to keep downward pressure on prices so that consumers will continue to profit from this relatively free and competitive market. Natural gas should be conserved for its highest and best use and should not serve as a short-term substitute for other fuels. Increased profitability of all segments of the gas industry should evolve from true economic growth within the economy, growth intimately tied to energy prices which allow our industry and agriculture to compete in the global market place.

By continuing this course of sound energy policy instead of succumbing to the short-term profit interests of certain segments of the gas industry, we as a Nation can avoid a repeat performance of the 1970's--shortage and rate shock--and lay a foundation for continued economic growth and fairness to all consumers.

I urge you to vote against repeal of the Fuel Use Act. Thank you.

TVC:crt

UNITED STATES DRILLING STATISTICS

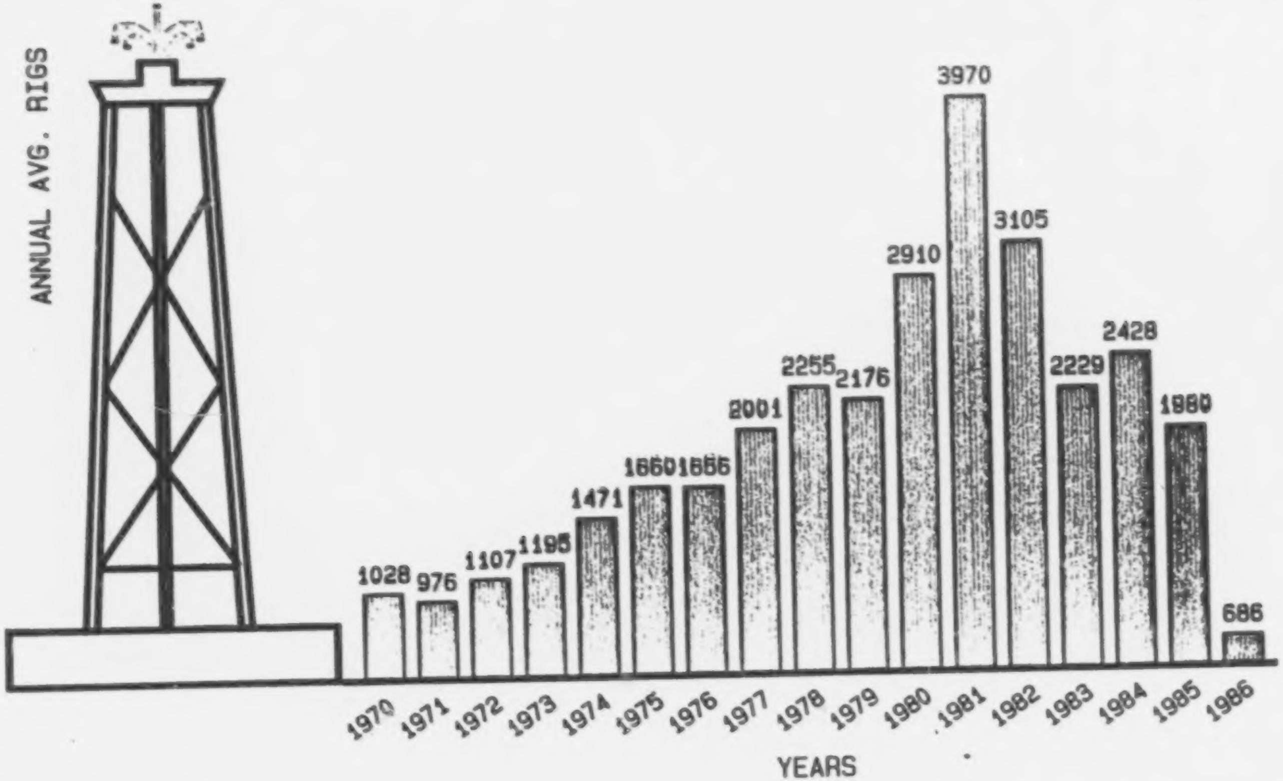
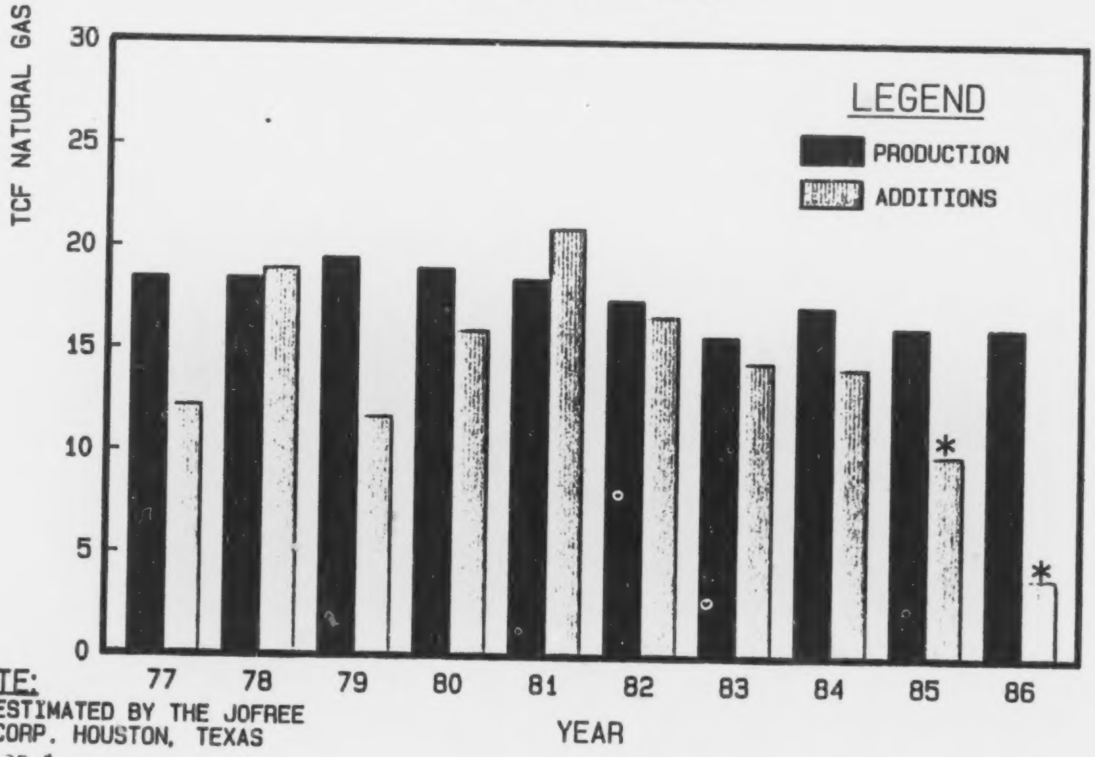


FIGURE 1

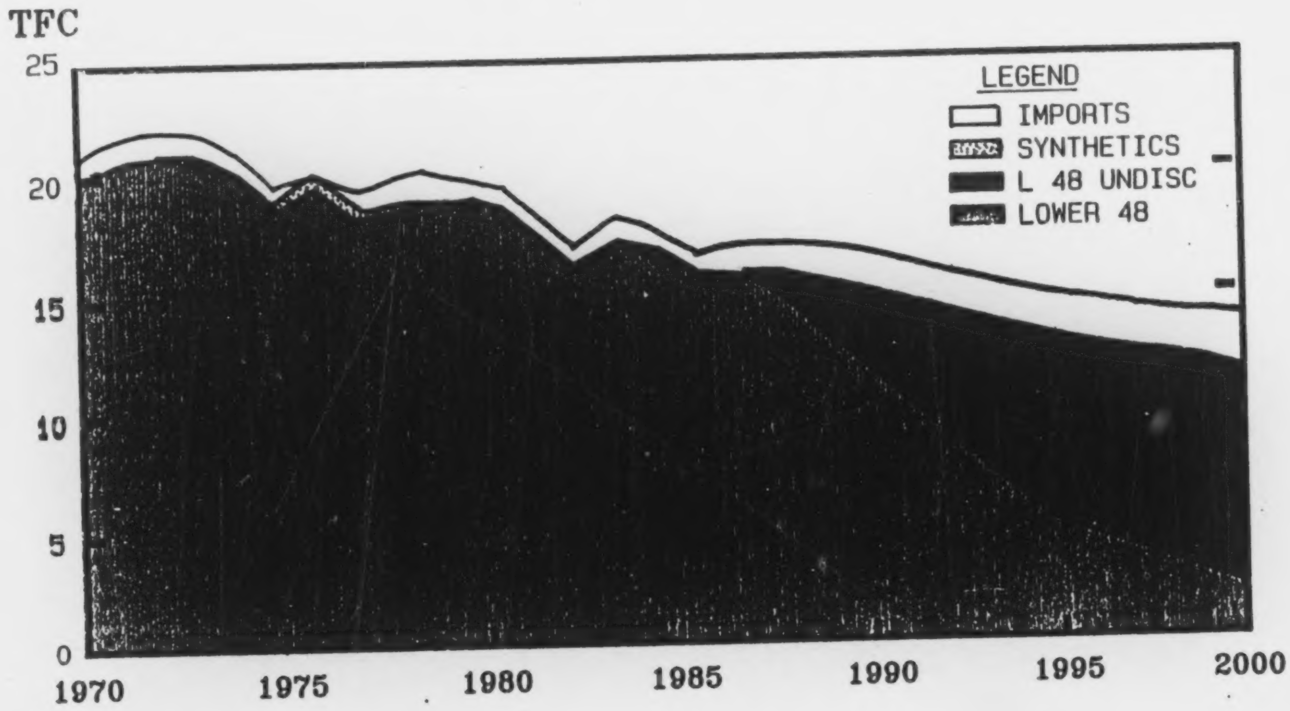
U.S. NATURAL GAS RESERVES
ADDITIONS AND PRODUCTIONS
1977 THROUGH 1986



NOTE:
* ESTIMATED BY THE JOFREE
CORP. HOUSTON, TEXAS

FIGURE 2

U.S. NATURAL GAS SUPPLY



SOURCE: SHELL OIL CO. 1986

FIGURE 3

Senator METZENBAUM. Let me ask you a few questions.

Mr. CHEMA. Yes, sir.

Senator METZENBAUM. The Gas Committee of the National Association of Regulatory Utility Commissioners supports repeal of the Fuel Use Act. You are a member of that Committee. As I understand it, you stand alone in opposition to repeal. Would you care to comment on that?

Mr. CHEMA. Mr. Chairman, it is true that I am a member of NARUC. The organization has voted to support repeal. This was done a year-and-a-half ago. While I generally support the positions which NARUC takes on important energy issues, this is one that I have to distance myself from. I just believe that it is a misguided policy on their part from the point of view of consumers, and the highest and best use of gas, and the least-cost gas purchasing policies.

I would note, Mr. Chairman, that the energy conservation committee of NARUC has agreed to take a second look at this issue.

Senator METZENBAUM. If we prohibit natural gas use in boilers when it makes economic sense to do so, are we not driving up the price of other forms of energy like coal? Is that not harmful to the consumers you are attempting to protect?

Mr. CHEMA. Mr. Chairman, I do not believe that is the case at all. When you look at the long-term implications of the pricing of natural gas, I think that this effort to artificially reduce the gas bubble at an earlier time will result overall in energy prices to consumers being substantially higher than any potential minor increase in coal prices for the use in electricity generation.

I do not believe that coal prices in fact have risen for electricity generators. In fact, at least in the case of Ohio, the cost of coal has substantially reduced since the passage of the Fuel Use Act. We had mines in Ohio that were selling coal as high as $62 per ton in 1978, whereas the price of that coal today is in the low $20-per-ton basis.

Senator METZENBAUM. Let me ask you one last question. As a regulator, how would you view the prospects of a utility being able to guarantee an assured 20- to 30-year supply of gas?

Mr. CHEMA. I do not believe, Senator, that any utility would come before us and indicate that they could so guarantee. I would certainly demand that they provide us with contracts. Then I would be extremely skeptical of the market-out and force majeure provisions if they were able to deliver such contracts. I do not believe that I would feel very secure with any such guarantees.

Senator METZENBAUM. Senator Nickles.

Senator NICKLES. Thank you, Mr. Chairman.

Mr. Chairman, just looking at your statement, page 3 you mention the people that want a repeal. They want to interfere with the market. Page 4, you say let the existing market work. But is it not a fact that the Fuel Use Act impedes the marketplace working as far as deciding which fuel should be used?

Mr. CHEMA. Mr. Chairman, Senator Nickles, I do not believe that in energy we have a totally free market. I believe the entire energy picture is subject to a variety of restrictions, some of which are domestically induced and some of which we have little or no control over because of the international nature of those restrictions.

The Fuel Use Act does take out from the market for natural gas a specific segment, but there clearly is a relatively free market operating within the segment of the market which is available to natural gas. I believe that market is operating appropriately, is operating today in the best interests of consumers, and I believe in the long-term the best interests of the gas industry as well.

Senator NICKLES. Is it not true that if pipelines have so much of a market and they have so much fixed costs that they have to amortize over that market, if you restrict their sales to industrial plants or to utilities that they have to amortize those fixed costs over a smaller base and therefore have higher costs for their residential users?

Mr. CHEMA. Mr. Chairman, Senator Nickles, I cannot argue with the logic of that, but I would suggest that the better course for the gas industry in trying to expand its market is not to obtain this new segment, the electric utility business, but rather it is to try to engage in appropriate kinds of economic development so that the size of the pie itself will be increased, rather than their trying to get a larger slice of that pie.

Senator NICKLES. Well, again, are not pipelines going to be required to pass on a higher portion of their fixed costs on to their residential users, to the consumers, to Joe Blow and John Smith out there that are paying their bills in Ohio? Are they not going to have to pay higher bills and charge more to your customers because they are not able to sell to an industrial plant or to an electric utility? I think your statement saying that it would be bad for the pocketbooks is just totally wrong.

Mr. CHEMA. Mr. Chairman, Senator Nickles, in Ohio, and I think generally across the Nation, three-quarters of the consumers' gas bill is the commodity costs of the gas, and only one-quarter is the cost of delivering that gas to the burner tip.

I think it would take an awful lot of efficiencies by utilization of the pipeline capacity in order to overcome the increase in the gas prices which I think we can see with the end of the bubble.

Senator NICKLES. I just will make a comment, I think that is absurd.

[Laughter]

Senator NICKLES. Gas prices in our State are about $1.40. If you look at what the price is going into the residential, you are looking at $4. So you are looking at a large percentage of that being delivery and transportation costs. Anyway, I just make that comment. I appreciate your statement.

The CHAIRMAN [presiding]. Thank you, Senator Nickles.

Mr. Chema, thank you for pointing out that NARUC, of which you are a member, endorsed the repeal of the Fuel Use Act. You mentioned that they were to reconsider their position, to meet again. Did you know that the Gas Committee of NARUC did in fact meet again two weeks ago and reiterated their support of repeal of the Fuel Use Act?

Mr. CHEMA. Mr. Chairman, Senator Johnston, I am aware of the NARUC meetings. I was there. I indicated that the Energy Conservation Committee of NARUC has agreed to take a second look at the question of the repeal of the Fuel Use Act. The Executive Committee of NARUC did not, again, deal with the question of the Fuel Use Act at its winter meetings two weeks ago.

The CHAIRMAN. I understand two weeks ago the committee that met reiterated their support and said that since their first action had been so clear and so overwhelming, your opposition notwithstanding, that they found it unnecessary to bring it before the full NARUC.

Mr. CHEMA. Senator, I am not sure what their rationale was. Unfortunately, I was not on either the Gas Committee or the Executive Committee at NARUC at the time of the original action, so I also cannot comment on the basis for that action in 1985.

The CHAIRMAN. Thank you, Mr. Chema.

Senator McClure.

Senator McCLURE. I have no questions.

The CHAIRMAN. Senator Ford.

Senator FORD. Thank you, Mr. Chairman.

Mr. Chema, I am fascinated at your ability. Don't you ever back up. You are doing a terrific job.

[Laughter.]

Senator FORD. Just remember, these Senators up here that are fussing at you a little bit put their pants on like you do, one leg at a time.

[Laughter.]

Senator FORD. Is there any Canadian gas coming in to Ohio?

Mr. CHEMA. Mr. Chairman, Senator Ford, very little. There are proposals, however, to establish at least one additional pipeline coming into Ohio through Ohio, one of the purposes of which would be to bring natural gas from Canada into the northeastern part of the United States. Under he 436 ruling of FERC, presumably that gas would be available in Ohio. Today, there is very little. I think there is a serious danger as we look at that natural gas coming from Ohio similar to the kinds of problems that we are facing on the electric utility side with the amount of imported electric power that we are now receiving in the United States from Canada.

Senator FORD. I understand from some of my Senate colleagues that when the Canadians make a bid on sources of energy down here, it is whatever your lowest price is less 20 percent. That puts a government-subsidized utility into place in the United States by us accepting those contracts.

I just have one final question. Mr. Chairman, would an import fee, would it be letting the marketplace work on energy coming into this country? Would that be letting the marketplace work?

Mr. CHEMA. Mr. Chairman, Senator Ford, I know there is a lot of debate about an import tax on oil. I do not know of similar debates of proposals relative to import taxes on gas, but certainly any type of restriction, or tax, or tariff has an impact on the market forces.

Senator FORD. I was just trying to get to the point that we are talking about letting the free market work its will, and yet those who pound the table the loudest about that are very anxious to put on an import fee, and that eliminates the free market from working, as I understand it.

Of course if they want to put an import fee on coal coming into this country, that might get my attention.

[Laughter.]

Senator FORD. Thank you, Mr. Chairman.

The CHAIRMAN. Senator Hecht.

Senator HECHT. Thank you. No questions.

The CHAIRMAN. Senator Domenici.

Senator DOMENICI. I wonder if you support elimination of acid rain as a legislative thrust up here?

Mr. CHEMA. Mr. Chairman, Senator Domenici, I believe, and I believe the State of Ohio firmly feels, that we need to do substantially more to eliminate the impact of acid rain throughout the Nation. We in Ohio have over the last several years spent $2 billion on acid rain control from the utility boiler point of view. The people of the State of Ohio have recently agreed to spend $100 million for clean coal technology.

We look forward to additional assistance from the Federal Government on that source, and we certainly support the diminution of acid rain.

Senator DOMENICI. Well, there are two bills up here, the Mitchell bill is one. Do you support it?

Mr. CHEMA. Mr. Chairman, Senator, not in its current form; but we certainly hope we can work with the Senate and the House of Representatives in developing a piece of legislation which will make sense to all of the people of the United States, including the people of Ohio.

Senator DOMENICI. Is Ohio doing a pretty good job of complying with the Clean Air Act of the United States?

Mr. CHEMA. Mr. Chairman, Senator, I suspect that is a matter open to debate. We think we have done a substantially improved job over the last four years. We are generally in compliance both from a power plant and an industrial point of view. We are coming into compliance with regard to the emissions from the transportation sector, automobiles.

Senator DOMENICI. As a matter of fact, it is true that the State of Ohio has never reached the ambient standards required under United States law, has it?

Mr. CHEMA. Mr. Chairman, Senator, I do not know whether we "ever" have. I know that in the past we have had problems doing that.

Senator DOMENICI. Well, if you did, you did for some second at midnight when nobody measured it.

[Laughter.]

Senator DOMENICI. You are doing great. As a matter of fact, your State contributes more SO_2 to the atmosphere all by itself than 11 Western States combined. Do you have any responsibility with reference to the utility companies and compliance with the Clean Air Act?

Mr. CHEMA. Mr. Chairman, Senator, not directly. However, I believe that the economic regulation which we have over the utility companies inherently requires us to be concerned with the efficiency with which they operate, and I believe that environmental concerns are part of that efficiency, and therefore we do have a responsibility to try to ensure that they are providing their services at the most reasonable costs, reliably, and with the minimum environmental impact.

Senator DOMENICI. I know that every time you have been asked a question with reference to natural gas, you are clairvoyant and you predict 30 years from now; but what if your utility commission was like California's commission and you were charged with the responsibility of giving your users the lowest possible rates? What if that was your charge? Would you be willing to ask for competition in terms of proposals to see if your utility users would get a lower rate with the repeal of the Act we are talking about? Or do you think that is irrelevant?

Mr. CHEMA. Mr. Chairman, Senator, I do not think that is irrelevant at all. I think that part of our responsibility is to try to ensure the most reasonable prices, not necessarily the lowest prices at any given moment in time because that in fact can totally skewer your market.

In Ohio, the policy of the Public Utilities Commission is to try to present opportunities, options, alternatives to the natural gas industry and to the electric utility industry so that competition where it exists and where it can viably exist can work to put downward pressure on prices, which is in the best interests we believe not only of the consumer, residential and industrial consumer, but also in the best interests of the utility companies.

Senator DOMENICI. I understand parochialism. I even understand it going in the energy area to the extent of bulkanization, and I understand that happens. I regret it, but it kind of depends in this country on what fuel you are trying to protect, or what kind of workers you are trying to protect, and I am not critical. But as a matter of fact, you are concerned in your testimony here, you are concerned about the coal industry in your State and coal workers, are you not?

Mr. CHEMA. Senator, of course I am concerned with the coal industry. The coal industry in Ohio has been buffeted recently. But I would point out that we have more people employed in the natural gas industry in Ohio than we do in the coal industry. I am equally concerned with employment in that industry, and in my testimony I am concerned across the board with what is in the best interests of consumers.

It is important that we have economic development. Without that, neither the coal industry nor the natural gas industry is going to be healthy in the State of Ohio.

Senator DOMENICI. Are you concerned about steel workers?

Mr. CHEMA. Absolutely, Senator.

Senator DOMENICI. Do you have any idea what the impact of the current shriveling of the domestic oil and gas industry is doing to steel demand in the United States?

Mr. CHEMA. Senator, I know that the lower cost to LTV Steel, USX, and Armco in the State of Ohio have made it possible for those companies to survive in their present form. I am not sure that rising prices for the natural gas for those industries would allow them to continue to be competitive.

Senator DOMENICI. Would it shock you to know that 40,000 wells were not drilled in the United States this year that were contemplated to be drilled and the projections showed would be drilled. Would it shock you if you knew that this was the equivalent amount of steel that the entire Ford Motor Company would use in one year's production of automobiles in the United States?

Mr. CHEMA. Senator, I am not familiar with those statistics. Obviously there has been a decrease in the amount of drilling that has taken place. I believe that the market as it exists today will cause that drilling to come back as we reach an equilibrium on the forces of supply and demand, and there is no necessity to repeal the Fuel Use Act for that to take place.

The market will in fact send drillers back into the fields when the price is right, and the price will be right as the bubble dissipates.

Senator DOMENICI. Well, I understand. I anticipated that kind of answer based upon your predictions of the future in the energy field which permit you on every one of the questions with reference to the Fuel Use Act to talk about 10, 15, 20 years from now. I am not arguing with you other than to say I do not know anybody that has been right, so I do not know why I should assume you would be right, either.

I have no further questions.

The CHAIRMAN. Senator Evans.

Senator EVANS. No questions.

The CHAIRMAN. Mr. Chairman, I just had one further question.

Mr. Chema, suppose an electric utility came to your commission and they had built a gas turbine baseload plant, and they also bought another hundred acres of land, put special blades on their turbine, they had added $150 million of cost—$150 million of cost—and you asked the executive, what is that $150 million? And he said, well, that is so we will be ready for an integrated gasification combined cycle, or so-called IGCC unit, and you asked him, well, do you have plans to put that on? And he said, no, but we might want to. And if you further asked him, well, are those things economically viable? And he would say, no, but we hope maybe they might be someday. I mean, they are experimenting with them, after all.

And then he said, but, Mr. Chema, I want your commission to put that $150 million in the rate base and let the folks pay for it, because after all, someday it may be good to put in that IGCC unit. Would you say that was prudent?

Mr. CHEMA. Mr. Chairman, Senator Johnston, I think I would suggest that if that was that utility executive's best judgment that his shareholders should take that risk rather than the ratepayers of the State of Ohio.

The CHAIRMAN. In other words, it would not be prudent. I think that is a good and honest answer. Would it therefore be prudent for us as legislators to order the same thing to be done? That is, to order it by Federal statute?

Mr. CHEMA. Mr. Chairman, Senator Johnston, I don't know the answer to that question. I do not know whether that would be prudent or not. I do not believe the real issue is the alternate capacities here.

I think the real issue is whether natural gas is going to be used for its highest and best use, and whether it will be used economically today.

The CHAIRMAN. You see, some of my friends in the coal industry are arguing that we ought to go ahead and modify the Fuel Use

Act by having coal capability built into the capacity. With respect to this IGCCU, a gas turbine, that means having it ready to retrofit for an IGCC unit and having the land for the coal.

And that would cost, according to testimony we had last year, $150 million. That precise situation is what is being suggested to us. Our friend Mr. Farrand, I think, is going to explain later why we should do as a Congress what you would not do as a prudent regulator.

Thank you, Mr. Chairman.

Senator **METZENBAUM** [presiding]. Our next panel consists of Mr. Chris Farrand, Vice President, Government Relations, Peabody Holding Company; representing the National Coal Association. And Mr. Nick Bush, President of the Natural Gas Supply Association of Washington.

We're very happy to welcome both of you. I think you've heard, we do have five-minute rule, and we're going to hold you to it.

Mr. Farrand, do you want to proceed?

STATEMENT OF CHRIS FARRAND, VICE PRESIDENT, GOVERNMENT RELATIONS, PEABODY HOLDING CO., INC., ON BEHALF OF THE NATIONAL COAL ASSOCIATION AND THE AMERICAN MINING CONGRESS

Mr. **FARRAND**. Thank you, Mr. Chairman.

My name is Chris Farrand. I'm Vice President of Peabody Holding Company, which, through its subsidiaries, is the nation's largest coal producer.

I'm here today representing the National Coal Association and the American Mining Congress.

I want to say at the outset that we in the coal industry support the thrust of S. 85. We believe that the ban, the artificial constriction on gas and oil use in the electric utility sector, ought to be restricted, and that by and large, market forces ought to come to play.

I think many of us in the industry were uncomfortable, if I can use that term, with the thrust of the Fuel Use Act in 1978. What was in fact at that time direct fuel allocation, some would argue it was in our favor those days.

We weren't certain that some day it might be against us, and we were uncomfortable, and in fact, did not support that Act.

So we applaud Senator Johnston's bill, and indeed, support it.

Having said that, however, I do want to offer one reservation. I think my reservation has already been introduced, and that is, that we think that there ought to be a modicum requirement that in the inherent design of new base load power plants, we ought to take the steps that would not make the commitment of that plant to gas an irreversible commitment.

Now, let me talk about what that idea is and what it isn't. I think there's been a great deal of misunderstanding about what we're suggesting.

First of all, we would suggest that there be no restrictions whatsoever, no quote coal capability requirements on peak and intermediate load facilities.

We also believe there should be no restrictions on industrial facilities. We think there are a lot of applications in that sector for which gas is probably the fuel of choice, and probably will remain the fuel of choice.

With respect to base load power plants, we have absolutely no adverse feeling about the idea that they ought to be able to come in and compete. The question is, are we going to compete in a way that makes coal an impossibility if market conditions dictate that coal will someday be the economic fuel of choice.

Now what does that mean? With respect to a boiler fired power plant, a conventionally fired power plant, the difference between a gas or an oil plant and a coal-capable plant, at the outset, is the size of the fire box, the ability to extract the ash material, and the internal coal handling facilities.

It does not include any of the external coal handling facilities, or any of the pollution control equipment. We would suggest that you put into this plant initially those things which can be used in the coal conversion process, but which are not necessary until you actually convert the coal.

Now we can talk a little bit later about what those incremental costs or penalty costs would entail in a boiler fired power plant.

I think what the basic argument is over this act is whether or not the electric utility sector will be free to use new and important technology, i.e. the gas turbine, or combined cycle, or in its ultimate iteration, the integrated gassification combined cycle unit?

What we suggest in that instance is that the turbine itself be constructed in such a way that it could handle synthetic gas or gas from coal if in fact market conditions dictate that you eventually gassify coal as an intake fuel.

What does that entail? I hate to dispute the numbers given out by Senator Johnston, but I've never heard the $150 million figure.

Yesterday, while in fact Mr. Bush and I were testifying in the House, I did get a response from a major vendor of those, who said that the difference between a turbine that is never going to be used with gassified coal and a turbine that is capable of being used with gassified coal is probably in the neighborhood of $400- to $500,000 in basic different costs.

It has to do with the material in the blades, and the size of the intake ducts for the gas itself.

I think my time has expired. I would be happy to answer any questions.

[The prepared statement of Mr. Farrand follows:]

TESTIMONY OF

CHRIS FARRAND

VICE PRESIDENT - GOVERNMENT RELATIONS
PEABODY HOLDING COMPANY, INC.

ON BEHALF OF

NATIONAL COAL ASSOCIATION
AND
AMERICAN MINING CONGRESS

ON

S. 85
REPEAL OF THE FUEL USE ACT OF 1978

BEFORE THE

SUBCOMMITTEE ON ENERGY REGULATION AND CONSERVATION

COMMITTEE ON ENERGY AND NATURAL RESOURCES
UNITED STATES SENATE

WASHINGTON, D. C.

MARCH 12, 1987

Mr. Chairman, Members of the Subcommittee, my name is Chris Farrand. I am Vice President of Peabody Holding Company, Inc., which through its subsidiaries is the nation's largest coal producer. I appear today in behalf of the National Coal Association and the American Mining Congress. We appreciate the Subcommittee's indulgence in hearing the complex issues related to the proposals to repeal or modify the Powerplant and Industrial Fuel Use Act.

At the outset, I want to assure the members that we in the coal industry believe the Fuel Use Act needs to be modified, and that is why we welcome the discussion here today.

The Fuel Use Act

The Fuel Use Act of 1978 began as an experiment in fuels allocation at a time when the country faced shortages of available oil and natural gas supplies and quantum increases in energy prices generally. In its original form, the Act had two stated purposes:

> The first purpose was to force utility powerplants and major industrial facilities burning oil or natural gas to convert to coal or other alternative fuels by 1991.
>
> The second purpose was to bar the use of oil or natural gas in any new powerplant or major industrial plant approved and constructed after the date of enactment.

In 1981, Congress amended the Act to eliminate the provisions requiring the forced conversion of plants from gas or oil to coal. The amendments did not strike the provisions designed to facilitate such conversions by providing expeditious regulatory treatment and modified environmental requirements. However, the decision to convert powerplants from oil or gas to coal would henceforth be voluntary.

The legislation currently before this Subcommittee, S. 85, proposes to repeal the second stated purpose of the original Act -- the ban on the use of oil or natural gas in newly-constructed powerplants and major industrial facilities. Significantly, S. 85 does not call for total repeal of the Fuel Use Act, as it would leave in place the provisions designed to facilitate voluntary fuel conversion projects.

We in the coal industry support repeal of the ban on the use of oil or natural gas in new plants. We believe that the market conditions ought to dictate the choice of fuels. In fact, many in the coal industry opposed enactment of the Fuel Use Act in its original form, primarily because it attempted to allocate fuel use.

Proposed Amendment

However, we strongly urge the adoption of an amendment to S. 85 which would require that new powerplants be designed so that future voluntary conversion to coal use would not be precluded. This amendment has been called the "coal capability" amendment, but this designation is probably a misnomer since we do not propose that plants be required to be made currently capable of burning coal, but they be technologically capable of being modified or converted to coal as future conditions warrant. The idea espoused in the proposed amendment is not so much coal capability as it is "coal convertibility".

The amendment also proposes to exclude from any fuel use or design constraints all industrial facilities and all electric generating facilities except those powerplants designed for baseload operation. Powerplants designed for peak load or intermediate load use would be excluded from the Act.

Moreover, under the amendment we suggest, powerplants destined for baseload use[1] would be subject to the exemption processes contained in the current act. This means that even for those baseload powerplants subject to the "coal capability" requirement, operators could continue to obtain permanent exemptions to that requirement.

We also suggest language permitting the use of peak or intermediate load facilities as baseload units under emergency circumstances.

Current regulations define "coal capability". For conventional steam electric generating facilities "coal capability" means that the plant is designed and constructed with a boiler of sufficient size to utilize coal. It also means that there is adequate space to add at a future time the external coal handling facilities and the equipment necessary to meet Clean Air Act requirements. It does not mean that the plant currently must be fully capable of using coal. Rather, it means that it must be designed so that possible future use of coal in the facility is not absolutely and forever precluded from a technological standpoint.

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[1] "Baseload use" is currently defined as annual use exceeding 3500 hours.

With respect to gas turbine generating technology, "coal capability" obviously would have a different meaning, although the current regulations do not specifically address the issue. A gas turbine generator is a discrete unit incapable by itself of using either coal or residual oil, although both natural gas and distillate oil may be used as fuel. Often such units are paired with small steam electric generating units utilizing waste heat from the turbine. These "paired" units are called combined cycle units. A third element in an integrated combined cycle facility is a coal gasifier which can convert coal to a low Btu gas, which is then consumed in the turbine. At this time it may not be economically viable for a complete integrated gasification-combined cycle system, or IGCC as these systems are known, to compete with other electric power generating technologies. Nevertheless, with the development of the Coolwater Project in California and others, we are learning more about such systems, and widespread application of this technology may not be far off in time.

There is at the present widespread interest in the use of gas turbines by themselves to generate electricity. We have seen numerous applications for exemptions under the current Fuel Use Act. We suggest that "coal capability" in such units be defined either in statute or regulation in such manner as to include the land area for the possible addition of a gasifier at the front end of the turbine and that the turbine be designed to allow retrofitting with coal gasifiers. As with the conventional boiler technology, we are not suggesting that the unit be coal-capable as is, but rather that it is capable of being adapted to coal use as market conditions warrant.

The reasons for the relative attractiveness of gas turbine technology are complex, and some of the reasons may be shortsighted. Gas turbine generators, at an appropriately small scale (100-200 megawatts), are efficient, clean, and relatively inexpensive to construct. Because the units themselves are purchased "off the shelf" and do not have to be custom designed, the construction time period is short, perhaps two years or less.

Conventional coal-fired powerplants enjoy economies of scale, and the technology is better suited for larger-sized installations. There are higher capital costs involved and because of their size, longer construction time periods are required. However, the total cost of producing electricity in these larger plants over their entire life-cycle may be significantly lower than smaller gas turbine facilities, depending upon comparative fuel costs.

In recent years, uncertainty about growth in electricity demand and resistance or second-guessing by regulatory commissions have made utilities wary of large-scale capital projects with longer construction time frames. There appears to be a tendency to add generating capacity in smaller and smaller increments at the lowest possible capital cost and in the shortest possible time. Faced with regulatory pressures, the tendency is understandable, but it may ignore longer term considerations by creating greater dependence on relatively expensive fuels.

Mr. Chairman, we believe the real issue in dealing with the Fuel Use Act is the question of prudence. A coal-fired powerplant can be readily converted from coal to oil or natural gas, but a gas or oil-fired facility cannot be converted to coal unless certain design characteristics are inherent. To commit a significant portion of our baseload generating capacity to the irreversible reliance on relatively scarce fuels may be an imprudent act.

Ironically, the additional costs associated with making new facilities capable of being converted to coal may be deemed an "imprudent" expenditure by state regulatory authorities, especially when the proposing utility cannot guarantee that such capability will ever be put to use. Utilities wishing to safeguard consumers over the long run by voluntarily building in maximum fuel use flexibility may find the additional capital costs cannot survive the scrutiny of utility commissions, whose primary objective is the lowest possible consumer electric rates, not long-term energy security. That is why we believe a Congressionally-mandated coal convertibility requirement should be maintained. We suggest that these additional expenditures -- to insure the capability to convert if necessary -- constitute a prudent investment in national energy security.

Mr. Chairman, I want to reiterate our support for modifications to the Fuel Use Act. We believe that the arbitrary restriction on the use of particular fuels should be lifted. However, we strongly feel that a modicum requirement should be maintained to insure that, should market conditions warrant, conversion to coal is not a technological impossibility. The absence of fuel use flexibility could prove to be an unfair burden on electricity consumers.

On behalf of Peabody, the National Coal Association, and the American Mining Congress, I appreciate the opportunity to present to the Subcommittee our views on this issue. I would be happy to respond to questions.

The CHAIRMAN [presiding]. Let us go ahead and hear from Mr. Bush.

STATEMENT OF NICHOLAS J. BUSH, PRESIDENT, NATURAL GAS SUPPLY ASSOCIATION

Mr. BUSH. Mr. Chairman, Members of the subcommittee, my name is Nicholas J. Bush, and I'm President of the Natural Gas Supply Association, an organization that represents domestic producers who market about 90 percent of the nation's natural gas.

We appreciate the opportunity to offer the Association's views on S. 85 and other proposals that would repeal FUA and the incremental pricing requirements of the NGPA.

We support strongly S. 85, but do oppose any addition of a so-called coal capability amendment.

I must say that it's a little uncomfortable to sit next to the coal association and be at odds with them. As most of the members of this subcommittee know, we have been strong allies over the last four or five years, advocating the passage of comprehensive natural gas legislation that would fully deregulate wellhead prices, provide equal access, and repeal FUA.

We still would prefer, as most of you know, that type of legislation. However, it appears that the Congress isn't willing to consider passage of that kind of legislation, although I'm encouraged by the expression of fears about future supplies and perhaps that will rekindle interest in deregulation of wellhead prices.

But in the event that it does not, we're strongly willing to support S. 85, provided that it's not amended as suggested by the coal industry, so as to worsen the already limited ability of natural gas to compete.

Members of the subcommittee are well aware of the difficult times being experienced by producers, and the potential significant problems that may pose for the nation.

The downturn hasn't escaped any part of the country. Mr. Chema is right in point out, and I thought it would be of interest to the Chairman, although he's not with us right now, that actually the largest decline in petroleum drilling in 1986 was in Ohio, where drilling fell by 44 percent over previous year-end totals.

When compared to 1984, domestic gas producers 'revenue decline was more than $5 billion in 1985, and more than $13 billion in 1986.

That's a drop of 41 percent in revenues over a two-year period, while demand declined about 11 percent.

Mr. Chema noted that the commodity price somehow reflects three-quarters of the end-use price. I just ought to note from the EIA numbers that in September of 1986, the average wellhead price was $1.54, and the residential delivered price was $6.82.

Based on generally accepted pricing and demand forecasts for 1987, revenues to gas producers this year are likely to be even lower than in 1986. To the extent that those prices are the consequence of increasing competition among fuels, producers may not be happy, but at least they realize, I believe, that they have to live with those market driven realities.

However, legislative restraints that deny natural gas future opportunities to compete for sales from buyers who believe that it might be economic and environmentally advantageous are counterproductive.

Natural gas is a potentially abundant domestic resource, and it can and should play a more significant role in the nation's energy mix for the rest of this century.

We have stated on many occasions, and I want to reiterate our belief, that removing wellhead controls is the best way to enhance gas 'ability to compete for future sales and ensure the least expensive supplies in the future.

But it would help—it would help significantly—to remove market disincentives to exploration such as the Fuel Use Act, which limit natural gas 'marketing opportunities.

There doesn't seem to be a great deal of opposition to repeal of the Fuel Use Act, although there do seem to be two questions that most often arise.

One is, it's widely acknowledged that exemptions are generally granted, and so why bother to repeal the act?

Our answer to that is simply that there's no way to know how many lost opportunities have occurred because utility and industry planners are unwilling to go through the expensive and cumbersome exemption process. But certainly there have been lost opportunities.

There's also been some concern expressed that clean repeal of the Fuel Use Act would lead to decisions by electric utilities on fuel selection and facility construction that are expedient in the short term but adverse in the longer run.

On the contrary, virtually eliminating natural gas consumption in future electric utility base load facilities—and that's the inevitable consequence of the proposed coal capability amendments as we've seen them—would be shortsighted; expensive for consumers; and counter to the rational market-driven decisions now being made by power plant operators.

In effect, coal capability amendments would eliminate natural gas as a competitor even in market areas where construction of gas fired base load combustion turbines, and gas fired base load combined cycle plants make overwhelming economic sense.

These amendments also would deny natural gas an opportunity to contribute to power generation in the initial stages of those IGCC plants.

Basically our message is that there needs to be flexibility, not the kinds of investment decisions that were made in the past based on very expensive, rigid, single fuel power generation facilities.

We see that flexibility now, Senators, in the power plant decisions that are being made. We want to preserve it if not increase it.

So we would urge you, if you consider passage of S. 85, that it be done so clean and free of any counterproductive amendment.

[The prepared statement of Mr. Bush follows:]

TESTIMONY
OF
NICHOLAS J. BUSH
FOR THE
NATURAL GAS SUPPLY ASSOCIATION
(NGSA)

BEFORE THE
UNITED STATES SENATE
SUBCOMMITTEE ON ENERGY REGULATION & CONSERVATION
COMMITTEE ON ENERGY & NATURAL RESOURCES

THURSDAY, MARCH 12, 1987

THE NATURAL GAS SUPPLY ASSOCIATION (N-G-S-A) IS A NATIONAL TRADE ASSOCIATION BASED IN WASHINGTON. N-G-S-A REPRESENTS DOMESTIC PRODUCERS OF NATURAL GAS ON LEGISLATIVE AND REGULATORY ISSUES AT THE FEDERAL LEVEL. THE INDEPENDENT AND INTEGRATED NATURAL GAS PRODUCTION COMPANIES WHICH ARE MEMBERS OF N-G-S-A MARKET ROUGHLY NINETY PERCENT OF THE NATION'S NATURAL GAS PRODUCTION.

N-G-S-A IS PLEASED TO BE OFFERED THIS OPPORTUNITY TO PARTICIPATE IN THESE TIMELY PROCEEDINGS CONCERNING NATURAL GAS DEREGULATION THROUGH MODIFICATION OF THE FUEL USE ACT AND REPEAL OF THE INCREMENTAL PRICING PROVISIONS OF THE NATURAL GAS POLICY ACT OF 1978 (N-G-P-A). OUR REMARKS, MR. CHAIRMAN, WILL BRIEFLY ADDRESS CURRENT GAS MARKET ISSUES AND CONCENTRATE ON MATTERS PERTINENT TO MODIFICATION OF THE POWERPLANT AND INDUSTRIAL FUEL USE ACT (F-U-A) WHICH N-G-S-A OPPOSED AT THE TIME OF ITS PASSAGE IN 1978.

REPEAL OF THE END-USE CONSTRAINTS ON NATURAL GAS IMPOSED BY THE FUEL USE ACT AS WELL AS REPEAL OF THE INCREMENTAL PRICING PROVISIONS OF THE N-G-P-A, ARE CERTAINLY CRITICAL COMPONENTS OF WHAT WE BELIEVE SHOULD BE A COMPREHENSIVE APPROACH TO REMOVING THE FEDERAL GOVERNMENT FROM THE DIFFICULT BUSINESS OF MICRO-MANAGING DOMESTIC ENERGY MARKETS. N-G-S-A IS COMMITTED TO LESSENING AND ULTIMATELY ELIMINATING THE DISTORTIONS WHICH HAVE DEVELOPED IN NATURAL GAS MARKETS DUE TO FEDERAL INTERFERENCE. IT IS ONLY THROUGH COMPREHENSIVE LEGISLATION DESIGNED TO ELIMINATE ALL WELLHEAD REGULATIONS; PROVIDE FOR OPEN ACCESS, NON-DISCRIMINATORY TRANSPORTATION OF GAS BY INTERSTATE PIPELINES; AND REMOVE THE END-USE CONSTRAINTS ON NATURAL GAS USE, THAT CONSUMERS WILL REALIZE THE MANY PRICE AND OTHER BENEFITS WHICH TRULY COMPETITIVE NATURAL GAS MARKETS WOULD ENGENDER.

N-G-S-A STRONGLY SUPPORTS S. 85, AUTHORED BY SENATORS JOHNSTON AND DOMENICI AND CO-SPONSORED BY MANY MEMBERS OF THE ENERGY COMMITTEE. S. 85 WOULD SERVE TO ELIMINATE SOME OF THE ARTIFICIAL IMPEDIMENTS TO RESPONSIBLE, ECONOMICALLY SOUND DECISIONS ABOUT FUEL USE CHOICES FOR POWERPLANTS AND MAJOR

FUEL BURNING INSTALLATIONS (M-F-B-I'S). WE HOPE, MR. CHAIRMAN, THAT THE SUBCOMMITTEE IS DISPLAYING THIS INTEREST IN S. 85 AND OTHER NATURAL GAS ISSUES DUE TO CONGRESSIONAL CONCERN OVER THE STRANGLEHOLD WHICH FEDERAL REGULATIONS HAVE ON THE MARKETS FOR NATURAL GAS.

AS WE ARE ALL NOW WELL AWARE, FEDERAL NATURAL GAS PRICE CONTROLS DURING THE 1960'S AND EARLY 1970'S CAUSED PRICES AT THE WELLHEAD TO BE HELD AT LEVELS SO LOW THAT PRODUCERS HAD LITTLE INCENTIVE TO DRILL FOR AND DEVELOP NEW NATURAL GAS RESERVES. IN FACT, N-G-S-A WAS FORMED MORE THAN 22 YEARS AGO IN RESPONSE TO CONCERNS THAT FEDERAL REGULATION OF THE WELLHEAD PRICE OF NATURAL GAS DEDICATED TO INTERSTATE COMMERCE WOULD RESULT IN A SERIOUS EROSION OF SUPPLY. THIS CONCERN WAS SOON BORNE OUT AS EXPLORATION ACTIVITY DWINDLED IN RESPONSE TO DECLINING PRODUCER REVENUES WHICH RESULTED FROM FEDERAL CEILING PRICES FOR NATURAL GAS.

AS EXPLORATION FOR NATURAL GAS SUPPLIES DECLINED, DEMAND FOR GAS ROSE DUE TO PRICES HELD AT ARTIFICIALLY LOW LEVELS. SUPPLY SHORTAGES DEVELOPED IN THE INTERSTATE MARKET BECAUSE DEMAND OUTPACED SUPPLY AND BECAUSE INTRASTATE PIPELINES, UNFETTERED BY THE SHACKLES OF PRICE REGULATION WERE ABLE TO OUTBID INTERSTATE PIPELINES FOR THE DECREASING SUPPLIES OF AVAILABLE NATURAL GAS.

CONGRESS' RESPONSE TO THE SHORTAGE OF GAS AVAILABLE FOR DELIVERY TO NATURAL GAS CONSUMERS WAS NOT TO SIMPLY EXIT THE GAS BUSINESS SO THAT MARKET FORCES COULD BRING SUPPLY AND DEMAND INTO EQUILIBRIUM, BUT, INSTEAD, IT WAS TO ENACT THE N-G-P-A, THE F-U-A AND OTHER FAR-REACHING ENERGY LEGISLATION. ALTHOUGH ONE GOAL OF THE N-G-P-A WAS TO END PRICE DIFFERENCES BETWEEN INTERSTATE AND INTRASTATE GAS MARKETS, THE N-G-P-A'S ARTIFICIAL PRICING SCHEME, IN FACT, FORCES CONSUMERS IN SOME REGIONS OF THE COUNTRY TO PAY MORE FOR GAS THAN SIMILARLY SITUATED CONSUMERS PAY ELSEWHERE. THESE PRICE DIFFERENTIALS -- WHICH CONTINUE TODAY -- OFTEN ARE NOT DUE TO MARKET FACTORS, BUT ARE THE DIRECT RESULT OF THE CONTINUED IMPOSITION OF OUT-DATED REGULATIONS REQUIRING, AMONG OTHER THINGS, WELLHEAD CONTROLS FOR "OLD" GAS AND COAL CAPABILITY IN NEW POWERPLANTS AND M-F-B-I'S.

PROPONENTS OF COAL CAPABILITY IN NEW INSTALLATIONS MAY ARGUE THAT BECAUSE NO APPLICATIONS FOR WAIVERS OF THE COAL

CAPABILITY REQUIREMENTS IMPOSED BY THE F-U-A HAVE BEEN DENIED SINCE 1981, CONSUMERS HAVE NOT MADE ANY UNNECESSARY OUTLAYS TO PAY FOR COAL CAPABLE CAPACITY WHICH WASN'T NEEDED. YET, IT IS IMPOSSIBLE TO MEASURE THE NUMBER OF LESS EXPENSIVE NATURAL GAS FIRED POWERPLANTS AND GAS FIRED INDUSTRIAL FACILITIES WHICH WERE NEVER BUILT DUE TO THE DISINCENTIVES POSED BY THE FUEL USE ACT DESPITE THE PRESENCE OF THE EXEMPTION OPTION. IN ADDITION, THE EXEMPTION APPLICATION PROCESS IS EXPENSIVE AND SOMETIMES DILATORY.

ANOTHER UNFORTUNATE LEGACY OF THE CONGRESSIONAL ENERGY ACTIVITY OF THE LATE SEVENTIES IS TODAY'S NATURAL GAS GLUT. CONGRESS ALTHOUGH WISELY ENCOURAGING THE DEVELOPMENT OF NEW GAS RESERVES BY SOME PROVISIONS OF THE N-G-P-A, AT THE SAME TIME ELIMINATED NEW MARKETS FOR GAS BY VIRTUE OF LEGISLATION SUCH AS THE F-U-A. THE INEVITABLE RESULT IS THAT MANY GAS PRODUCERS HAVE SUFFERED SERIOUS ECONOMIC INJURY DUE TO THE SURPLUS-INDUCED COLLAPSE IN GAS PRICES WHICH COMMENCED EVEN PRIOR TO THE DATE OF PARTIAL DECONTROL UNDER THE N-G-P-A, ON JANUARY 1, 1985.

SIMPLY STATED, IT WAS POORLY PLANNED GOVERNMENT WELLHEAD REGULATIONS WHICH EVENTUALLY GENERATED A SHORTAGE IN THE MID-SEVENTIES. THAT ARTIFICIAL SHORTAGE IN TURN CAUSED A FEDERAL REACTION WHICH HELPED GENERATE THE CURRENT DELIVERABILITY SURPLUS IN NATURAL GAS. THE LAST 25 YEARS CLEARLY HAVE TAUGHT THAT THE FEDERAL GOVERNMENT IS NOT WELL-EQUIPPED TO PROTECT CONSUMERS THROUGH TINKERING IN ENERGY MARKETS.

AS INDICATED EARLIER, WE BELIEVE THAT THE FUEL USE ACT IS ANOTHER EXAMPLE OF ILL-ADVISED FEDERAL INTERFERENCE IN THE ENERGY MARKETPLACE. ALTHOUGH ITS OSTENSIBLE PURPOSE WAS TO ASSURE THAT "PREMIUM" FUELS SUCH AS OIL AND NATURAL GAS WERE NOT CARELESSLY SQUANDERED, IT IS ALSO EVIDENT THAT THE FUEL USE ACT WAS USED AS A VEHICLE BY COAL INTERESTS IN AN EFFORT TO ACHIEVE AN UNFAIR COAL ADVANTAGE OVER NATURAL GAS AND OIL.

JUST AS 50 YEARS OF UNNECESSARY GOVERNMENT CONTROLS ON NATURAL GAS HAVE WRECKED HAVOC FOR GAS PRODUCERS, SO HAVE COAL PRODUCERS BEEN THE VICTIMS OF CRUEL PROMISES IN THE FORM OF FEDERALLY MANDATED MARKET FAVORITISM WHICH MASKED UNDERLYING PROBLEMS. ALTHOUGH THE CAUSES WERE DIFFERENT, THE RESULT HAS BEEN THE SAME FOR BOTH NATURAL GAS AND FOR COAL PRODUCERS:

EACH INDUSTRY IS STRUGGLING WITH GLUTTED MARKETS AND AN INABILITY TO READ THE DISTORTED MARKET SIGNALS CAUSED BY PAST AND PRESENT GOVERNMENT REGULATION.

DESPITE THESE FACTS, SOME STUBBORNLY CLING TO THEIR OUTDATED BELIEFS THAT THE FEDERAL GOVERNMENT IS CAPABLE OF SOMEHOW MANIPULATING COMMODITY MARKETS SO AS TO PROVIDE LONG-TERM CONSUMER BENEFITS. FOR EXAMPLE, THERE ARE THOSE WHO CONTINUE TO PREDICT THAT COMPLETE DEREGULATION OF NATURAL GAS WOULD RESULT IN A PRICE FLY-UP DESPITE THE ACTUAL EXPERIENCE WITH PARTIAL DECONTROL ON JANUARY 1, 1985. PARTIAL DECONTROL RESULTED IN A SUSTAINED DECLINE IN NATURAL GAS SPOT MARKET PRICES WHICH ONLY RECENTLY HAVE MODERATED AT A LEVEL ROUGHLY FIFTY PERCENT BELOW THE PRICES WHICH EXISTED UNDER THE FULL PRICE CONTROL REGIME.

WE CAN ONLY ASSUME THAT THOSE SAME PROGONOSTICATORS ARE RESPONSIBLE FOR DEMANDS TO RETAIN THE FUEL USE ACT AND ITS FALSE PROMISE OF A COAL CAPABILITY PANACEA. THOSE WHO OPPOSE THE LOGICAL STEP OF REMOVING FULLY AND COMPLETELY FROM THE BOOKS UNNECESSARY FEDERAL REGULATIONS SUCH AS THE FUEL USE ACT

EXHIBIT A FUNDAMENTAL DISTRUST OF MARKET MECHANISMS AS WELL AS A SHORT-SIGHTED VIEW OF THE PUBLIC INTEREST.

IN A STUDY RELEASED IN FEBRUARY OF 1986, THE ENERGY INFORMATION ADMINISTRATION (E-I-A) STATES THAT ALTERNATING PERIODS OF NATURAL GAS SURPLUS AND SHORTAGE HAVE BEEN MET BY COUNTER-PRODUCTIVE LAWS AND REGULATIONS "CAUSING DISORDERS OF ONE KIND IN TIMES OF SURPLUS AND DISORDERS OF ANOTHER KIND IN TIMES OF SHORTAGE. FEDERAL POLICY HAS SHIFTED ACCORDINGLY, BUT TO DATE UNSUCCESSFULLY."*/

N-G-S-A CONTINUES TO ADVOCATE A COMPREHENSIVE POLICY CONSISTING OF TOTAL DECONTROL OF ALL NATURAL GAS AT THE WELLHEAD, REMOVAL OF THE END-USE CONSTRAINTS ON GAS, AND THE OPENING UP OF THE NATURAL GAS TRANSPORTATION SYSTEM AS THE MOST EQUITABLE AND ECONOMICALLY EFFICIENT MANNER OF ASSURING ADEQUATE SUPPLIES AT THE LOWEST REASONABLE COST TO CONSUMERS NATIONWIDE.

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*/ "AN ANALYSIS OF NATURAL GAS CONTRACTS," ENERGY INFORMATION ADMINISTRATION (VOL. I, FEBRUARY 1986).

HOWEVER, IF A PIECEMEAL APPROACH TO SOLVING ENERGY MARKET PROBLEMS IS TO BE ADOPTED, CARE MUST BE EXERCISED TO ASSURE THAT THE ORIGINAL GOAL IS KEPT FIRMLY IN SIGHT. THE FUEL USE ACT AS CURRENTLY WRITTEN REPRESENTS A STRONG DISINCENTIVE TO THE USE OF GAS AND OIL IN POWERPLANTS AND M-F-B-I'S AS WELL AS AN UNNECESSARY AND ARTIFICIAL STIMULUS TO THE UTILIZATION OF COAL IN SUCH FACILITIES. ONE OF THE PRIMARY PURPOSES OF S. 85 IS TO ELIMINATE THE COAL PREFERENCE AND THEREBY PERMIT MARKET SIGNALS TO BE TRANSMITTED AND RELIED UPON IN MAKING DECISIONS ABOUT THE CONSTRUCTION OF NEW POWERPLANTS AND OTHER FACILITIES. RECALLING THAT NATURAL GAS PRODUCERS AND COAL PRODUCERS ARE BOTH IN THE SAME SITUATION -- DROWNING IN SURPLUS FUEL SUPPLIES DEVELOPED IN RESPONSE TO ARTIFICIAL GOVERNMENT SIGNALS -- THE SUGGESTION THAT S. 85 SHOULD BE MODIFIED SO AS TO REQUIRE NEW ELECTRICAL POWERPLANTS TO BE "COAL CAPABLE," IS ILL-ADVISED.

SOME MAY ARGUE IN RESPONSE THAT THE CURRENT GLUT OF ENERGY IN WORLD MARKETS IS ONLY TEMPORARY AND, THEREFORE, "COAL CAPABILITY" SOMEHOW REPRESENTS ENHANCED "ENERGY SECURITY" IN THE LONG TERM. INDEED, PROPONENTS OF STATUTORY

COAL CAPABILITY FOR NEW ELECTRICAL POWERPLANTS MAKE VAGUE ALLUSIONS TO ENERGY SECURITY ADVANTAGES WHICH ARE SUPPOSED TO FLOW FROM MULTI-FUEL CAPABILITIES.

THERE CAN BE NO ARGUMENT BUT THAT ALL UTILITY CUSTOMERS WOULD BE BEST SERVED IF EVERY UTILITY IN THE NATION COULD INSTALL THE CAPABILITY TO GENERATE NUCLEAR, WIND, COAL, GAS, OIL, SOLAR AND SYNFUEL POWER ALL IN THE SAME FACILITY. BUT, THE MORE REALISTIC QUESTION IS HOW MUCH "ENERGY SECURITY" CAN CONSUMERS AFFORD? GIVEN THE UNCERTAINTY PRESENT IN TODAY'S VOLATILE ENERGY MARKETS, CONSUMERS WOULD BE BEST SERVED BY POWERPLANT INSTALLATIONS WHICH PERMIT PLANT MANAGERS FLEXIBILITY IN FUEL CHOICES WITHOUT BURDENING UTILITY CUSTOMERS WITH UNNECESSARY UPFRONT COSTS.

ADDING INCREMENTAL BASELOAD ELECTRICAL POWER CAPABILITY THROUGH THE INSTALLATION OF COMBINED CYCLE NATURAL GAS FIRED TURBINES IS ECONOMICALLY AND ENVIRONMENTALLY EFFICIENT. THE INSTALLATION TIME FOR SUCH BASELOAD GENERATION CONFIGURATIONS IS RELATIVELY SHORT IN CONTRAST TO NUCLEAR OR COAL PLANTS. FURTHER, THE INITIAL CAPITAL COSTS ARE MUCH LOWER. FINALLY, GAS COMBINED CYCLE TURBINES PROVIDE THE FLEXIBILITY TO LATER

INSTALL COAL GASIFIERS IN ORDER TO TAKE ADVANTAGE OF CHANGING FUEL PRICES.

AT THE PRESENT TIME, REASONABLE ESTIMATES INDICATE THAT THERE ARE SUBSTANTIAL RESERVES OF NATURAL GAS IN THE GROUND, JUST AS THERE ARE SUBSTANTIAL RESERVES OF COAL AWAITING DEVELOPMENT. UNDER THESE CIRCUMSTANCES IT SEEMS LOGICAL TO ENCOURAGE THE DEVELOPMENT OF ALL DOMESTIC ENERGY RESERVES. WITH COAL AND NATURAL GAS CLEARLY IN RELATIVE ABUNDANCE, THOSE WHO WILL BE FISCALLY RESPONSIBLE FOR THEIR ECONOMIC DECISIONS -- THE PEOPLE WHO HOPE TO BUILD ELECTRICAL POWERPLANTS OR OTHER MAJOR FUEL BURNING INSTALLATIONS -- SHOULD BE PERMITTED TO MAKE MARKET-BASED CONSTRUCTION DECISIONS FREE OF GOVERNMENT INTERFERENCE.

IT IS ALSO TIME TO RECOGNIZE THAT PAST EXPERIENCE HAS CAUSED STATE REGULATORS AND LOCAL UTILITY MANAGERS TO BECOME MORE SOPHISTICATED AND CAUTIOUS IN THEIR FUTURE PLANNING. THE NATIONAL DEBACLE OF BILLIONS OF DOLLARS WASTED ON CANCELLED NUCLEAR POWER PLANTS IS NOT LIKELY TO BE REPEATED -- ABSENT A GOVERNMENT MANDATE SUCH AS A COAL CAPABILITY REQUIREMENT -- IN FUTURE BASELOAD POWERPLANT CONSTRUCTION DECISIONS.

MOST UTILITIES ARE COMMITTED TO CONSTRUCTION OF POWERPLANTS WHICH ARE FLEXIBLE IN THEIR FUEL REQUIREMENTS AND WHICH ARE CAPABLE OF MEETING BASELOAD DEMAND INCREASES THROUGH INCREMENTAL CAPITAL OUTLAYS RATHER THAN THROUGH MASSIVE OUTLAYS FOR SINGLE FUEL, MULTI-BILLION DOLLAR PROJECTS. THE FUNDAMENTAL POINT IS THAT LOCAL UTILITIES, AS THE PURCHASERS OF FUEL AND SUPPLIERS OF POWER, BEAR THE MAJOR RESPONSIBILITY FOR THEIR DECISIONS. THAT IS AS IT SHOULD BE.

ALTHOUGH MUCH OF THE DISCUSSION CONCERNING THE ISSUE OF "COAL CAPABILITY" HAS BEEN FOCUSED BY THE COAL INTERESTS ON FUTURE FUEL PRICES, AN EQUALLY IMPORTANT FACTOR IS THE COMPARISON BETWEEN THE CAPITAL AND OPERATION AND MAINTENANCE (O-&-M) COSTS FOR GAS-FIRED AND COAL-FIRED FACILITIES. WHILE INTEREST GROUPS MAY ARGUE OVER FUTURE FUEL PRICES, THE CAPITAL INTENSITY OF ALTERNATIVE POWERPLANT CONSTRUCTION OPTIONS STRONGLY INFLUENCES CONSUMER EXPENDITURES FOR ELECTRICITY AT PREVAILING FUEL PRICES. FIGURES DEVELOPED BY THE ELECTRIC POWER RESEARCH INSTITUTE (E-P-R-I) ARE REVEALING.

FOR EXAMPLE, EXCLUDING FUEL COSTS, COAL GASIFIED COMBINED CYCLE POWERPLANT CAPITAL AND O-&-M COSTS ARE NEARLY THREE

TIMES ABOVE THE LEVEL OF SIMILAR EXPENSES FOR A GAS COMBINED CYCLE POWERPLANT WITH THE SAME ELECTRICAL OUTPUT CAPACITY. A COAL CAPABILITY REQUIREMENT WOULD THUS RESULT IN SUBSTANTIAL ADDITIONAL COSTS TO THE ELECTRIC UTILITIES, AND, ULTIMATELY, TO THE CONSUMER.

THE E-P-R-I NUMBERS DEMONSTRATE THAT AT CURRENT FUEL PRICES (A GAS PRICE OF $2.55 PER M-C-F, AND A COAL PRICE OF $1.55 PER M-C-F IN 1985 DOLLARS), GAS IS 35 TO 40% CHEAPER AT NORMAL CAPACITY FACTORS AND IS CHEAPER THAN COAL EVEN AT 80% CAPACITY FACTORS WHERE COAL'S MASSIVE CAPITAL COSTS ARE SPREAD OVER MORE HOURS OF POWERPLANT OPERATION.

THESE E-P-R-I CALCULATIONS SHOW THAT THE BUSBAR COST ADVANTAGE OF GAS COMBINED CYCLE POWER GENERATION OVER COAL-GASIFIED POWERPLANTS RANGES FROM 11 TO 22 MILLS/KW-HOUR AT PREVAILING FUEL PRICES. USING THE E-P-R-I CALCULATIONS, A 360 MEGAWATT PLANT MADE FULLY COAL CAPABLE AND OPERATING AT NORMAL CAPACITY FACTORS WOULD COST CONSUMERS ANNUALLY $28 TO $34 MILLION MORE PER PLANT THAN THE LESS EXPENSIVE GAS FUELED OPTION. FOR THE AVERAGE RESIDENTIAL CONSUMER OF ELECTRICITY, THIS TRANSLATES INTO AN INCREASED ELECTRICITY COST OF $98 TO

$196 PER YEAR. PLEASE REFER TO APPENDIX A, ATTACHED HERETO FOR AN OUTLINE OF THE E-P-R-I FIGURES. WE ASK THAT APPENDIX A BE INCLUDED AS A PART OF THE RECORD OF THESE PROCEEDINGS.

IN THIS LIGHT, THE QUESTION WITH REGARD TO COAL CAPABILITY IS STRAIGHTFORWARD: SHOULD COAL BE GIVEN FAVORED TREATMENT OVER NATURAL GAS DESPITE THE SUBSTANTIAL AND IMMEDIATE CONSUMER COSTS WHICH SUCH A COAL PREFERENCE WOULD IMPOSE ON CONSUMERS NATIONWIDE WHILE PROVIDING IN RETURN, AT BEST, THE UNCERTAIN PROMISE OF SPECULATIVE BENEFITS AT AN UNKNOWN TIME IN THE FUTURE? N-G-S-A BELIEVES FIRMLY THAT FUEL PREFERENCES AND INDUSTRY SUBSIDIES IN TODAY'S ENERGY MARKET ARE IRRATIONAL WITHOUT GREATER JUSTIFICATION THAN THAT ADVANCED BY THE COAL INTERESTS.

PETROLEUM PRODUCERS HAVE BEEN SUBJECT TO PRICE CONTROLS, WELLHEAD REGULATIONS, WINDFALL PROFITS TAXES, AND MANY OTHER BURDENSOME GOVERNMENT REQUIREMENTS WHICH HAVE PLACED OIL AND NATURAL GAS AT A DISADVANTAGE IN COMPETING WITH COAL. AT THE SAME TIME, COAL PRODUCERS HAVE RECEIVED GOVERNMENT PROTECTION AND BENEFITS WHICH RANGE FROM LEGISLATION SUCH AS THE FUEL USE ACT, TO BOILER FACILITY CONVERSION REQUIREMENTS FOR THE

MILITARY, MILITARY COAL STOCKPILING REQUIREMENTS, PROTECTION AGAINST MEASURES TO CORRECT ACID RAIN, COAL FREIGHT RAILROAD IMPROVEMENT MONIES, AND SIMILAR HANDOUTS.

UNEQUIVOCAL ELIMINATION OF THE F-U-A'S FUEL END-USE CONSTRAINTS AS PROPOSED BY S. 85 WILL NOT LEVEL THE PLAYING FIELD BETWEEN COAL AND NATURAL GAS. NEVERTHELESS, IT WILL BE AN IMPORTANT FACTOR IN REMOVING UNWARRANTED FUEL CHOICE BIASES IMPOSED BY FEDERAL FIAT.

OPPONENTS OF SIMPLE FUEL USE ACT REPEAL WANT TO MAINTAIN THE CUMBERSOME AND BUREAUCRATIC REGULATORY REGIME WHICH THEY BELIEVE IS APPROPRIATE DESPITE CURRENT CONDITIONS OF SURPLUS, WITHOUT REGARD TO THE NEEDS OF A HEALTHY ENERGY INDUSTRY, OR FOR ENCOURAGING THE DEVELOPMENT OF SECURE DOMESTIC NATURAL GAS SUPPLIES. ALTHOUGH PURPORTEDLY SUPPORTING THE INTERESTS OF CONSUMERS, PROPONENTS OF COAL CAPABILITY WOULD INSTEAD DENY CONSUMERS THE SIGNIFICANT BENEFITS WHICH WOULD ACCRUE FROM UTILITY FUEL USE CHOICES BASED ON COMPETITIVE AND ECONOMICALLY RATIONAL MARKET FACTORS.

TODAY WE FACE THE INEVITABLE CONSEQUENCE OF A MASSIVE DOWNTURN IN EXPLORATION AND DRILLING FOR NEW RESERVES. OIL AND GAS DRILLING LEVELS HAVE DECLINED PRECIPITOUSLY AND REMAIN DEPRESSED. WITH THE CURRENT DECREASE IN INTERNATIONAL ENERGY PRICES, THE PROSPECTS FOR DISCOVERY AND DEVELOPMENT OF NEW AND EXISTING RESERVES IS DIMINISHED.

REPEAL OF THE FUEL USE ACT WILL PROVIDE AN IMPORTANT INCENTIVE TO GAS PRODUCERS TO SEEK NEW MARKETS FOR NATURAL GAS. THE DEVELOPMENT OF NEW MARKETS WILL ENCOURAGE DOMESTIC EXPLORATION AND DRILLING AND THAT WILL IMPROVE THE PROSPECTS FOR FUTURE DOMESTIC ENERGY SECURITY.

IN A STUDY PREPARED FOR N-G-S-A BY PAUL A. LONDON & ASSOCIATES, INC., THE CONTRIBUTION WHICH NATURAL GAS CAN MAKE TO DECREASING THE U.S. TRADE DEFICIT AND INCREASING U.S. ENERGY SECURITY WAS OUTLINED. THE STUDY FOUND THAT DEREGULATION OF WELLHEAD NATURAL GAS PRICES COMBINED WITH OPEN ACCESS TO INTERSTATE PIPELINES COULD SLASH THE UNITED STATES' TRADE DEFICIT ATTRIBUTABLE TO OIL IMPORTS BY FIVE BILLION DOLLARS ANNUALLY.

THE STUDY GENERALLY FOUND THAT GOVERNMENT REGULATIONS CUT ANNUAL DOMESTIC GAS PRODUCTION AND SALES BY ABOUT TWO TRILLION CUBIC FEET, THE EQUIVALENT OF ROUGHLY ONE MILLION BARRELS OF IMPORTED OIL PER DAY. MR. CHAIRMAN, WE ASK THAT MR. LONDON'S STUDY ATTACHED HERETO AS APPENDIX B, BE INCLUDED IN THE RECORD OF THESE PROCEEDINGS.

ADEQUATE SUPPLIES FOR MANY YEARS OF NATURAL GAS CONSUMPTION DO EXIST. HOWEVER, THERE MUST BE AN INCENTIVE FOR PRODUCERS TO EXPLORE FOR, DISCOVER AND DEVELOP SUCH RESOURCES. THE CONTINUATION OF PRICE CONTROLS AND OTHER DISINCENTIVES TO EXPLORATION SUCH AS THE FUEL USE ACT ONLY RESULT IN CONSUMERS PAYING MORE THAN IS NECESSARY. WE DO NOT SEEK PROTECTION FROM FOREIGN IMPORTS, SUBSIDIES, OR PREFERENTIAL TREATMENT. GAS PRODUCERS WANT ONLY TO REMOVE FEDERALLY MANDATED BIASES WHICH FAVOR CERTAIN FUELS OVER OTHERS IN END-USE DECISIONS.

THE TIME HAS COME FOR THE GOVERNMENT TO CEASE ITS EFFORTS AT MICRO-MANAGING NATURAL GAS AND COAL MARKETS. BALANCE WILL RETURN WHEN THE GOVERNMENT PERMITS MARKETS TO WORK

NATURALLY. AS SUPPLY AND DEMAND FOR ALTERNATE FUELS REACH EQUILIBRIUM CONSUMERS NATIONWIDE WILL BE THE BENEFICIARIES.

IN CLOSING, N-G-S-A SUPPORTS S. 85 AS AN IMPORTANT VEHICLE FOR MOVING TOWARD ENERGY MARKETS WHICH ARE IN BALANCE. THANK YOU FOR THIS OPPORTUNITY TO PRESENT THE VIEWS OF THE NATURAL GAS SUPPLY ASSOCIATION.

*****

APPENDIX A

COST OF ELECTRICITY AT THE BUSBAR FOR ALTERNATIVE 360 MEGAWATT COMBINED CYCLE TECHNOLOGIES

(1985 Dollars)

GAS COMBINED CYCLE

Costs (Mills/Kwh.)	Plant Capacity Factor 50%	60%	70%	80%
Capital	10.9	9.1	7.8	6.8
Fixed O&M	1.5	1.3	1.1	.9
Variable O&M	1.7	1.7	1.7	1.7
SUBTOTAL	14.1	12.1	10.6	9.4
Natural Gas Cost ($2.50/MMBTU)	19.8	19.8	19.8	19.8
TOTAL BUSBAR COST	33.9	31.9	30.4	29.2

COAL GASIFIED COMBINED CYCLE

Costs (Mills/Kwh.)	Plant Capacity Factor 50%	60%	70%	80%
Capital	34.2	28.5	24.4	21.4
Fixed O&M	6.8	5.7	4.9	4.3
Variable O&M	.5	.5	.5	.5
SUBTOTAL	41.5	34.7	29.8	26.2
Coal Cost ($1.55/10^6 BTU)	14.0	14.0	14.0	14.0
TOTAL BUSBAR COST	55.5	48.7	43.8	40.2

GENERAL ECONOMIC PREMISES

General Inflation Rate = 6.0%
Discount Rate (Current $) = 12.5%
Fixed Charge Rate (Current $) = 16.5%
Fixed Charge Rate (Constant $) = 9.6%
Investment Tax Credit = 8.0%

Debt = 50% @ 11.0% per yr.)
Preferred = 15% @ 11.5% per yr.) Current $
Common = 35% @ 15.3% per yr.)

Book Life = 30 yrs.
Tax Recovery Life = 15 yrs.

Source: Developed by the Electric Power Research Institute; results appear in: "IGCC: Phased Construction For Flexible Growth", EPRI Journal, Volume 11, Number 6, September 1986, pp. 4-11.

APPENDIX B

NATURAL GAS REGULATION AND THE U.S. BALANCE OF PAYMENTS

By Paul A. London and Associates, Inc.
for the
Natural Gas Supply Association

NATURAL GAS REGULATION AND THE U.S. BALANCE OF PAYMENTS

Summary

Higher oil imports and a worsened balance of payments deficit are an overlooked cost of continuing wellhead regulation of natural gas and the powerful grip of pipelines on transportation to gas markets.

This study estimates that natural gas price regulation and restricted access to transmission services will add $5 billion to the U.S. balance of payments deficit in 1986 (assuming an oil price of about $14 per barrel). This is because regulation and limits on access to transmission cut domestic gas production and sales by about 2 trillion cubic feet (Tcf), equivalent to 1 million barrels of oil per day.

The inability of natural gas producers to get their gas to markets has been an important contributor to the U.S. balance of payments deficit since 1982. In 1985 alone, U.S. imports of petroleum and petroleum products cost the country $52.4 billion in 1985, while over 2 Tcf of domestic gas which could have replaced imported oil was "shut in" for lack of access to markets.

Imports of oil and oil products accounted for almost 38 percent of the U.S. trade deficit of $132 billion in 1985. In the first six months of 1986, the balance of payments deficit attributable to oil and oil products was $20 billion. This, despite a fall of about $9 per barrel in the price of oil compared to 1985. Oil imports according to the U.S. Department of Commerce rose about 20 percent (to 6 million barrels per day) in the first six months of 1986 relative to 1985. Getting "shut-in" U.S. domestic gas to market could reduce the balance of payments drain from oil imports by 15-25 percent.

Several studies demonstrate that U.S. natural gas is available to replace 1 million b/d of imported oil. Deregulation of wellhead prices (or even the consolidation of the myriad price ceilings for different categories of gas which FERC is proposing in its Order 451) would extend the "resource base" of lower cost gas for additional years without raising consumer prices.

Open access to transmission as required by FERC Order 436 will increase competition between pipelines, lowering the cost of getting gas supplies to the final consumer. Both will have the impact of making gas even more competitive with imported oil. A 1 million b/d, $5 billion per year reduction in oil imports is realistic and attainable.

Oil imports and the Balance of Payments

Petroleum and petroleum produce imports remain major contributors to the balance of payments problem. Their value rose from less than $2.7 billion annually in 1970, to $24.8 billion in 1975, to $77.6 billion in 1980. They have exceeded $50 billion every year since then, and are likely to exceed $40 billion in 1986 despite lower OPEC prices.[1]

U.S. imports of oil and oil products fell from 1977 until 1983 and then stabilized until recently.[2] Imports in the first six months of 1986, however, are running 1 million barrels per day higher than in the comparable period of 1985.[3] (The import surge continued in July and August, 1986.)

The increase in oil imports in 1986 is largely a function of lower oil prices. Between January and June, the import price of crude oil dropped from $27.14 to $14.03 per barrel. (It fell further in July but rebounded in August, 1986.)

Lower oil prices are encouraging greater use of gasoline and a rebuilding of oil inventories, two causes of increased imports little affected by impediments to competition from natural gas. But in commercial, industrial and utility markets lower oil prices also encouraged a small but noticeable shift to imported oil from domestic natural gas, a reversal of the increase in the

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1. Bureau of the Census, Statistical Abstract of the United States 1986, p. 816, and Bureau of the Census, FT900-86-0[illegible], Table 7.
2. Bureau of the Consus, Statistical Abstract of the United States 1986, p. 565.
3. Op cit, Statistical Abstract, and FT900-86-06 table 7.

market share of gas during the previous several years.[4] Increased oil imports at the expense of natural gas in these end-use areas were not a natural market response. They were a function of regulation.

Open Access, Flexible Prices, Lower Imports

Less regulation of wellhead prices and open access to transmission would make natural gas pricing more flexible and competitive "at the burner tip" where gas faces the challenge of oil imports. More flexibility in pricing would have prevented market losses to gas in the spring of 1986.

For example, in the Northeast early in 1986 there were instances of regulation-imposed delays in natural gas price adjustments, which allowed imports to temporarily take market from gas. And since transmission and distribution costs did not decline to meet oil competition, sales were lost to imports. Open access and competitive pricing of transmission services will increase gas sales at the expense of oil imports.

Adjustments in Wellhead, Transmission, and Distribution Costs to Meet Competition from Oil Imports

To discourage unnecessary imports of oil, all sectors of the gas industry should share the burden of meeting oil competition. In the first half of 1986, natural gas prices fell sharply at the wellhead to match the drop in oil prices. Natural gas producers lost billions in revenue and drilling activity was cut sharply as a result. Transmission and distribution costs, which are regulated, however, have not responded quickly to changes in the market.[5]

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[4] Natural Gas Supply Association, August 11, 1986, Follow-up to the Natural Gas Outook of June 24, 19896, Attachments 3 and 6.

Data confirms this. Average wellhead prices by March, 1986 had dropped over 50 cents from their peak ($2.66 in 1984) to $2.20 per Mcf, and they have fallen further since. Spot prices had fallen even more sharply to $1.40 and below $1.00 in some locations. But transmission costs to deliver gas to the city-gate in March, 1986 were the same $1.30 per Mcf they had been at the peak of gas prices in 1984.[6]

A comparison of the behavior of ocean shipping costs for imported oil with charges for the transmission and distribution of natural gas suggest how regulation of the latter has penalized gas producers and consumers and encouraged imports of oil

Prices for international tanker transportation reflect supply and demand for shipping. A decline in the volume of oil shipped means less demand for ships and lower transportation costs per ton. Oil tanker rates fell from $14.39/ton in January, 1981 to $6.60 a year later, and $5.50 in January, 1985.[7,8] This is what you would expect in a competitive market because exports and imports of oil were falling. Tanker owners suffered severe losses but, like oil and gas producers, were forced to make the adjustments required by the market.

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[5] Energy Information Administration, Natural Gas Monthly, May, 1986, Table 4, p. 10.

[6] Ibid.

In contrast regulated gas pipeline margins have failed to fall despite the fact that pipelines (like ocean transporters in the early 80s) are carrying less gas then in the past and refusing to take and market all the gas offered to them by producers.

Availability of Domestic Natural Gas to Replace Oil Imports

Natural gas gained market share at the expense of oil in residential, commercial, and industrial, and utility markets after partial decontrol under the Natural Gas Policy Act (NGPA).[9] Gas gained market share despite transmission and distribution costs, which were not responsive to market conditions because wellhead prices have been flexible. But

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[7] Over the period, they show less important variations which reflect seasonal and other shifts in supply and demand as well.

[8] Platt's Oilgram Price Report, Various Issues.

[9] DOE/EIA, Monthly Energy Review, April, 1986, pages 23, 25, and 29.

greater gains would have been possible during this period had pipelines been willing to transport to market all the gas available for sale.

Several studies in recent years suggest that unused domestic natural gas productive capacity was available from 1982 through 1985 to replace oil imports. Importantly, some of these studies show surplus gas available to replace oil imports through 1988, and suggest and even more optimistic outlook.

The Energy Information Administration (EIA) estimates that there has been surplus natural gas ("surplus deliverability") in the United States since 1981.[10] It appears that this surplus could have replaced between 500,000 and 1 million barrels per day of oil imports over the period from 1982 to 1986, had pipelines not been able to block producers from selling gas which producers wanted to market.

The American Gas Association also has developed estimates of the surplus of natural gas available in the U.S. since 1981. It's estimates are consistent with those of the EIA for the years 1982 to 1986. In addition, AGA sees surpluses equivalent to roughly 1 million b/d oil equivalent until 1988, when the surplus falls to 432,000 b/d.[11]

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[10] Energy Information Administration, Natural Gas Monthly, May 1986, Estimated Surplus Natural Gas, Table 6, p. 14.

Shearson Lehman Brothers also has done an analysis estimating a surplus of U.S. gas exceeding 1 million barrels per day of oil equivalent through 1987, falling to about half that in 1988.[12] Its estimates of the future surplus, therefore, are quite close to those of the AGA.

The Shearson and AGA studies (and another done by the Interstate Oil Compact Commission[13]) show large natural gas surpluses dissipating by the end of 1988. But there are reasons to believe that deregulation of natural gas could extend the period and increase the volume of gas of available to replace oil imports.

An Energy Information Administration study suggests that increasing prices for the lowest cost gas (some regulated at the prices below 50 cents per Mcf) would lead to significant increases in gas supplies.[14]

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[11] American Gas Association, May 16, 1986, Issue Brief 1986-19, Natural Gas Production Capability - 1986-1990, p.8, Table 3.

[12] Oil and Gas Journal, August, 1986, U.S. gas surplus seen shrinking by '88.

[13] Interstate Oil Compact Commission, July 1985, Natural Gas Deliverability Study, Final Report.

EIA has estimated that setting one ceiling price for "old" natural gas at about $2.60 per Mcf would increase the resource base of gas by about 27.7 Tcf. In terms of the balance of payments issue which is the focus here, this increase in the resource base might allow gas to replace one million b/d of oil for an additional 14 years. (2 Tcf = one million b/d oil equivalent)

With industrial oil (#6) at current levels (about $13 bbl. or $2.08 per Mcf), the full 27.7 Tcf in increased reserves is not likely to be forthcoming. But significant increases in the amount of gas available at current price levels will result quickly from an end to vintaging as foreseen in FERC Order 451. This is because the implementation of the order will raise the price of what is today the lowest cost gas, where the most modest price increases will generate the largest supply response. An increase in price of old gas now priced at 50 cents per Mcf to $1 or $1.50 is likely to produce a supply response that is very large.[15]

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[14] Energy Information Administration, RNGD-86-03, An Analysis of the Department of Energy's Notice of Proposed Rulemaking (NOPR), "Ceiling Prices: Oil Gas Pricing Structure", May, 1986.

[15] Op Cit, EIA (RNGD-86-03).

"Open Access" Pipeline Arrangements and Oil Imports

Correctly enforced "open access" pipeline arrangements like those proposed by the Federal Energy Regulatory Commission (FERC - Order 436) would tend to encourage production while making prices to end-users more competitive. They would encourage under-utilized pipelines to compete to carry gas, forcing transportation costs down, making gas more price competitive and reducing incentives to import oil.

For example, there are many pipelines serving the Northeast, e.g. Transco, Tennessee, Texas Eastern, Columbia, and Consolidated. Open access properly implemented would force them to compete for "traffic" to fill their systems when space is available. Energy users would still have a choice between oil and gas, but consumers prices could be lower.[16] More gas would be sold to push oil imports out of the market because producers would be able to "shop" to find pipelines to take gas which is now shut-in, i.e. in surplus.

Conclusion

Regulation and price controls on natural gas through the early

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16. This process would work best if state commissions encouraged competition between distribution companies, and between distribution companies and pipelines at the local level. The aim is to give the consumer a choice between fuels, but to push oil imports down by making sure that transportation and distribution costs do not bias that choice in favor of oil.

1980s have slowed the gains of natural gas at the expense of oil in the market place. The recent drop in the price of oil exaggerates that slowing trend and encourages additional oil imports that would not take place if gas were less regulated. Decontrolled gas prices (or even an end to vintaging) and FERC-mandated competition in transport rates by pipelines will reduce oil imports directly by as much $5 billion annually, and could have indirect benefits that are substantially greater.

The Chairman. Thank you very much, Mr. Bush.

Mr. Farrand, that $150 million figure that I used in the questioning of Mr. Chema came from testimony last year from Oklahoma Gas & Electric Company.

And indeed, I have here a letter which I would like to put in the record to Senator Ford, dated June 24, 1986, from Mr. James G. Harlow, Chairman and president of that company——

Senator Ford. Mr. Chairman, if you're going to use my letter, that's base load boilers. I want that prefaced on this. It might get confused, what you're trying to do here.

The Chairman. Exactly. I was just getting ready to read. Quote: We estimate that the added costs for a larger boiler and landspace would be around $150 per kilowatt, or based on the earlier illustration of 1,000 megawatts of gas fired capacity, would add $150 million to the cost of the plant.

That is a base load plant, and that's what we're talking about here. As you point out in your testimony, you would suggest that a peak load plant be exempted anyway.

Senator Ford. Well, we're talking about combined cycles.

The Chairman. But in any event, I would like to put that in the record.

[The letter referred to follows:]

OKLAHOMA ELECTRIC COMPANY

JAMES G. HARLOW, JR.
CHAIRMAN AND PRESIDENT

POST OFFICE BOX 321
OKLAHOMA CITY, OK 73101

June 24, 1986

The Honorable Wendell H Ford
United States Senate
SR-173A Russell Senate Office Building
Washington, DC 20510

Dear Senator Ford:

Thank you for your letter of June 10 in regard to my testimony before the Subcommittee on Energy Regulation concerning the Powerplant and Industrial Fuel Use Act of 1978 (PIFUA).

During the subcommittee hearings, I recall discussion in which I stated that a gas-fired electric powerplant could be constructed for approximately $500 per kilowatt and a coal-fired plant with scrubbers would cost approximately $1200 per kilowatt. Although one probably would not build a gas-fired powerplant that would be 1000 megawatts in size, I believe the 1000 megawatts of generation capacity was used for easy calculation to say that 1000 megawatts of gas-fired generating plants would cost about $500 million while 1000 megawatts of a coal plant would be about $1.2 billion in 1985 dollars.

The term "coal capable" gas-fired powerplants was mentioned during the hearing and, afterwards, Mrs Elizabeth Moler of the committee and Jim Wilson of our Company discussed this terminology further. The cost figures that Mr Wilson quoted were based on an interpretation of "coal capable" as being a larger plant site and larger boiler so that at some future date, the powerplant could be converted to coal-fired if that became necessary. We estimate that the added cost for a larger boiler and land space would be around $150 per kilowatt, or based on the earlier illustration of 1000 megawatts of gas-fired capacity, would add $150 million to the cost of a plant. The $500 million estimate for 1000 megawatts of gas-fired capacity then would increase to $650 million for a "coal capable" gas-fired powerplant. The difference from $650 million and $1.2 billion would be all of the other equipment necessary for an operational coal plant, which would include scrubbers, electrostatic precipitators, railroad cars and trackage, doziers, dumpers, hoppers, etc.

I appreciate the opportunity to respond to your questions and I hope that I have adequately answered them. The figures that I have stated are "ballpark estimates" which you had requested.

Sincerely,

J G Harlow Jr

cc: The Honorable Don Nickles

The CHAIRMAN. My questioning of Mr. Chema earlier was based really on your statement. I'm sure you recognize the statement.

What you say is, a gas turbine generator is a discrete unit incapable by itself of using either coal or residual oil. You point out that it is efficient and economically cheap.

But you suggest that coal—and I'm quoting now—we suggest that coal capability in such units be defined either in statute or in regulation in such manner as to include the land area for the possible addition of a gassifier at the front end of the turbine; and the turbine be designed to allow retrofitting with coal gassifiers.

Now we don't know what that costs. It may be up as high as $150 million, depending on how expensive the land is. It may be considerably cheaper.

But it's a lot of money. We know that much. As you further point out in your statement, this new kind of technology, as used in the cool water plant out in California, is not now economically prudent.

It is not now cost-effective. But it may be—might, may; you know, not for sure.

Now, would you agree with Mr. Chema's answer that if a company installed such a unit and added additional cost up to $150 million in hopes that maybe at some future, unknown date, he could put in some new technology, would you say that was prudent?

Mr. FARRAND. Yes, in this sense. First of all, I think we need to clarify. We've got a little apples and oranges problem. The $150 million he was talking about is for a conventional boiler fired power plant. I don't disagree with those numbers. For a 100 megawatt boiler fired power plant, the incremental or penalty costs of making it coal capable, by our definition, are probably in that range.

In a turbine, it is not that range. It is no additional equipment at the outset, except that the material used in the fans, and perhaps the fan spacing at the front end of the turbine, has to be such that it can accommodate the slightly more corrosive syngas rather than natural gas.

Land area is something I can't speak to, because that's geographic specific, site-specific, and I can't talk about that.

But you may have a problem there with respect to Mr. Chema's answer in which a utility, wishing to be prudent, not being able to get a 20- or 30-year gas contract, and wondering whether it's going to stick its consumers in the final analysis with an ever-escalating fuel cost—and remember, a majority of states in this country still have an automatic fuel adjustment clause—may be imprudent of them not to build in that flexibility.

On the other hand, state regulatory commissions, whose primary objective is to protect the ratepayer from rate increases, more or less in the shorter term, because that's the period in which they serve on the PUC, they may have a hard time doing that. They may have a hard time justifying those penalty costs, particularly since the utility company can never substantially prove that it's ever going to need that increment of equipment.

The CHAIRMAN. In other words, you would probably agree with Mr. Chema that it would be imprudent?

Mr. FARRAND. Yes, but I might put a twist on it and say that in the national interest—in the national interest—that's why you may need a national requirement saying that we deem those to be reasonably prudent. We deem that flexibility—that's buying an insurance policy——

The CHAIRMAN. On the chance that it might work?

Mr. FARRAND [continuing]. That's buying an insurance policy that that plant will indeed have multiple capability.

The CHAIRMAN. Even though that capability is not now economically viable and may never be? I hope cool water works, but it doesn't work by the economy now, does it?

Mr. FARRAND. Well, I feel remiss that I haven't talked to you about this before. We in fact supply coal, my company does, in substantial quantities, to an integrated gas combined cycle in your own state. It's run by Dow Chemical Company. We have just begun shipments this month to that facility.

Dow thinks that that is very economic, or they wouldn't put that facility right in the middle of a gas patch. And I think if we is not there soon, and if cool water is not the way to go about it.

And frankly, we recognize——

The CHAIRMAN. Well, that is a good plant, and I helped get the Federal subsidy for it, too.

[Laughter.]

Mr. FARRAND. One man's economics is another man's subsidy. But we recognize that this is an emerging technology, and there is a misunderstanding about what this coal capability is about.

We are not trying to stymy the development of that technology. In fact, my company is engaged in preliminary discussions over putting one in ourselves, building one ourselves, for a utility.

So we recognize that this is a trend, and we're not trying to stymy that trend. We're trying to make certain that that trend does not result in an irreversible commitment to a scarce fuel.

The CHAIRMAN. Let me ask one more question to both witnesses, first you, Mr. Bush.

We had testimony yesterday to the effect that if there was a gas shortage again—let us say we had an unusually cold winter— and there was such a pull on natural gas that you couldn't supply the deliverability requirements, we could not have a repetition of the shutdowns of industry we had in the winter of 1976/1977 because of the large fuel switching capability which about 40 percent of industry has.

If there was a gas shortage, these industries would in most cases simply switch to fuel oil or No. 6, but in any event you would not have the shutdowns of industry.

Do you agree with that?

Mr. BUSH. Well, I don't know exactly the specific numbers that you're referring to that those witnesses gave. There's no question that in the last few years, the demonstration that has occurred in the natural gas market is clearly the overwhelming capability to be fuel switchable.

I mean, anyone who is familiar with what is occurring in energy markets today, and in natural gas markets, the discipline that has been exerted, the over discipline to natural gas pricing, has been because of the immense capability to the price-sensitive customer now to switch on and off.

New Mexico gas can't even find a market in California because San Diego Electric has played it like a—you know, on and off on a constant basis with Indonesian 6.

So that kind of reality is there. Now whether it's as—whether it's to the degree that those witnesses, I can't attest to. But certainly, there's no question that the fuel capability in switching.

But Senator, I just—I hate to think that we have to be wedded into shortage mentality.

The **Chairman**. Well, there certainly isn't a shortage now, and I wasn't suggesting that.

Mr. **Bush**. I don't necessarily think—you know the tragedy of this argument is that coal is going to play a huge and growing role in the nation's fuel supplies in the 21st Century. I mean it's going to be a big, big—the IGCC's technology is being studied widely.

That isn't really the debate here. The debate is more what you were really getting at, is, should we mandate it ahead of the economic driven decision making, should we mandate high facility costs on to the consumer so as to in each case make this a guaranteed thing.

And I would just suggest to you that producers right now are paying for that in L&G plants that are sitting at the base of a trunkline system, where they're now being fed through both to the ratepayer, and they're being netted back to production costs, because we were all so sure that Algerian L&G was always going to be, with certainty, competitive.

And it's domestic producers that are paying for those plants, as well as ratepayers in the Midwest.

The **Chairman**. Mr. Chairman, I wanted to give Mr. Farrand an opportunity to reply, but I think I've used my time.

Senator **Metzenbaum** [presiding]. I don't want you filibustering your own bill.

The **Chairman**. Maybe somebody else will ask you that, Mr. Farrand.

Senator **Metzenbaum**. Senator McClure?

Senator **McClure**. I have no questions.

Senator **Metzenbaum**. Senator Ford?

Senator **Ford**. Mr. Farrand, do you wish to reply? I'll give you my time.

Mr. **Farrand**. Well, I guess my initial thought is, if we were concerned about whether L&G was always going to be competitive and made that mistake which was what, five or eight years ago that we made that commitment and it turned out to be a gross error, could not the same thing occur in reverse now if we made a commitment in a substantial way to base load gas fired capacity, only to have found that we made a mistake?

And we're not suggesting that one way or another is in fact a mistake. And he may be exactly right that gas will always be the fuel of choice for that particular technology.

What I'm saying is, he may be wrong. And our way at least provides a measure of insurance, so that if he's wrong, we've got a way to recover.

Senator **Ford**. Mr. Bush, let me ask you this question. Some later testimony that we will have will caution against this bill becoming a vehicle for major natural gas legislation.

So I ask you Mr. Bush, would you support this bill if it became a vehicle for major natural gas legislation?

Mr. **Bush**. We're supporting the bill as we see it right now, and we would have to consider every amendment as it came, before the markup and before it came to the Congress.

I don't know what type of amendment you're talking about, sir.

Senator **Ford**. Well, you just said that you were for comprehensive gas legislation.

Mr. **Bush**. We would prefer comprehensive legislation.

Senator **Ford**. Well, you might as well get ready then, because it's coming. I just wanted to alert you to that. So you better start making up your mind and hope that you can get on track.

Mr. Farrand, let me ask you, would the absence of a fuel adjustment clause make a difference in the prudency if gas prices rose sharply?

Mr. **Farrand**. It probably would be a psychological restraint at least on PUC's being willing to commit to single fuel fired facilities.

You know, what happens it that in the current regulatory regime, it seems to us that there is far more impunity to the utility executive if he makes a mistake with respect to fuel choices than if he makes a mistake with respect to the capital cost in the plant itself.

So he may decide that if it would be better to find the cheapest capital cost facility that he can find at the frontend and not worry so much about whether he's made a mistake with respect to fuel choices, because he's got a relatively more automatic path to recovery there.

And probably a heck of a lot less second guessing.

And that is why we believe that Congress needs to influence, to some degree, that disparity in the pressures that are put on those utility executives.

Senator **Ford**. You were into the costs—you mentioned a moment ago about the cost—Senator Johnston said $150 million. You had a somewhat lower figure.

Would you, in the brief time we have left, finish up that comparison and tell us exactly what would be deleted from the Fuel Use Act under the amendment you recommend?

Mr. **Farrand**. Well, to answer your second question first, we believe that the artificial constraint on fuel use ought to be lifted; and we believe that the fuels ought to compete in the market. And to that degree we applaud the bill.

With respect to the incremental costs of building in the minimum amount of coal convertibility if you will in the inherent design of the initial gas or oil plant, with respect to a turbine, we believe or are told that some of the turbines now that are being installed in combined cycle units, are probably capable of accepting from the turbine standpoint itself, synthetic gas, but there may be an incremental cost associated with the ductwork and the gaskets between an eventual gassifier and the turbine itself.

And the estimate I got yesterday is that that incremental cost is probably in the neighborhood of $4- to $500,000.

Now for a boiler fired plant, the figure Senator Johnston gave is probably reasonably accurate for a 1,000 megawatt plant. I don't dispute that. Because you've got to build in more of the coal capability in a boiler plant than you do in a turbine plant by a considerable degree.

On a percentage basis, however, that's probably about 25 percent. So that would be the penalty payment for a boiler fired plant that is capable within the meaning of our suggested amendment.

But for a turbine, the percentage is very small; at least that's what they tell me.

Senator **Ford**. Thank you, Mr. Chairman.

Senator **Metzenbaum**. Senator McClure?

Senator **McClure**. I would like to ask both witnesses one question.

If I understand, at least a portion of the argument is based upon the choices for alternative fuels, and the uncertainty about the development of technology and market supplies of various fuels.

Associated with that is the cost of both the technology and the costs of the fuels. Obviously, Senator Domenici is right when he questions any witness about our ability to forecast what is going to happen 30 years from now.

The shorter the term, the better our ability to forecast; although I would hate to press that very far.

Is there a distinction between life of plant and the need for building dual fuel capability?

Mr. **Farrand**. I'll take a crack. Obviously, the longer the plant is designed to be used, just as you cannot predict what fuel prices are going to be, the more important it is to design that plant to have the broader fuel use flexibility.

Now a conventional boiler fired power plant is usually designed for a minimum of 30 years. Some of them have operated for 40 and as long as 60 years.

For a turbine, we probably haven't had enough experience to know precisely how long they will be used. But my understanding is they're designed for somewhere between 20 and 30 years.

And bear in mind that turbines are relatively small, discrete units, somewhat off the shelf type equipment. So that the turbine, I suppose, could be replaced over time.

The gassifier would probably be a much longer term unit.

But the question is different I think for the two technologies, in that if you're going with a turbine technology as the first element of an eventual integrated gassification cycle, the second element being the waste heat recovery that goes into a steam boiler or steam producer, and into a steam driven turbine, the third element being the gassifier at the front end, it's a different question. Because you have more flexibility in that unit.

Mr. **Bush**. What bothers me is the inherent apparent distrust of the utility management and the state commission to provide for future facility construction that will be flexible, not rigid, able to respond to whatever the pricing of the fuel is at any given time.

Looking to the past, I guess all of us could look and say that a lot of things have been done that we wish hadn't been done in terms of economic judgments and forecasting.

What we see today when we see electric utility management and the preparations that are going on and even some of the state commission decisions that now, what we see is that they're building flexibility. The IGCC technology is a modular technology. It's generally conceive to be a turbine to eventually a gassifier. And that basically the utility for its own economic good sense, is going to understand that it wants to serve a region in more than the next five years.

It's going to want to be in business through the next century, and it's going to allow for the kind of decisions, both in siting and in facilities and in logical modular construction fashion will go for the life of the plant.

The question is, do we force fit, right now, when the economics don't mandate it, do we force fit these kinds of coal capability hardware into the plant that may very well be useful 30 years from now but aren't useful now.

Senator McClure. Well, I'm thinking now not of that basic question. What I want to do is separate for a moment, if I can, whether there's a timeframe difference that would yield to any kind of different policy.

Mr. Bush. Well, most of the turbines that I'm aware of that are state of the art that are being developed, most of the combustion turbines that are going to be purchased, as I understand, the Frame 7 in particular, is capable of handling syngas fired—the problem that is sometimes put up is that a combustion turbine that's fired from natural gas won't be able to take syngas because of metallurgical reasons and all that.

So if the plant is there and put in place, the combustion turbines that the Coal Association says are a problem, that the life expectancy of that would be such that if the gas fired comes on stream, that turbine could be fired by syngas.

Senator McClure. All right, what is that life span?

Mr. Bush. I think the logical is 20 to 30 years.

Senator McClure. The second question, Mr. Farrand, you said all you're interested in is base load electric plants, you're not interested in peaking or intermediate load plants.

What is the definition?

Mr. Farrand. And base load plant is defined in law as a plant that is used 3,500 hours or more per year to provide electricity; that's a statutory definition.

Senator McClure. So why that definition? Why are you concerned about that plant and not a plant of the same size that might be used for a different purpose? Why is that a logical distinction?

Mr. Farrand. Well, there's an economic penalty to building very large scale plants and only using them a fraction of the time.

Senator McClure. I understand that. But that has to do with the economic choice of the size of the unit and not the purpose for which the power is used, whether it's peaking or intermittent or base load.

Mr. Farrand. Well, I'm not certain I understand the question.

Senator McClure. Why did you choose base load and exclude the others?

Mr. Farrand. Well, we think there are probably some economies to putting in a low capital cost technology like a turbine for peaking and intermediate purposes, and we're recognizing those economies.

Senator McClure. What you're saying is, they can make the economies where they have to, but if they don't have to make them, we won't force them to—won't allow them to.

Mr. Farrand. By and large, that's true. You know, I think the base load capacity is the dependable source of electricity within any system, the constantly used source of electricity. And if you get into a supply or a price problem later on, you have no way out.

Senator McClure. Well, that changes too. Some plants were built for intermittent or interruptable service, and become base load just by the change in operation.

Mr. Farrand. And we would recognize that. We would say that in circumstances where you have a shortage of capacity that you could use your peak or intermediate as base under the defined circumstances.

Senator McClure. Thank you, Mr. Chairman.

Senator Metzenbaum [presiding]. The Chair has another committee meeting at the same time, and I was not here to make inquiries.

I have a couple of questions. Mr. Bush, a lot of people don't share your optimistic views of gas supplies.

EIA projects proven reserves will continue to decline in the next ten years. And this is shared by many of your colleagues, Amoco, Tenneco, and others.

Reserves now are lower than when we passed the act in 1978. Drilling is way down and EIA has shown the size of new fields continues to decline.

Based on those facts or such others as you have, where will our supplies come from, and how deliverable in the immediate future is that potential, and what will it cost to get it to the market?

Mr. Bush. Well, let me— Senator, the concern about supply, and I've voiced them before the committee on a number of occasions, let me see if I can break it down and take it in order.

We have often tried to testify before the committee that the current deliverability surplus masks the fact that have 159 tcf, or about ten years' supply of proven reserves in natural gas.

And we have another 34 in Alaska, but basically, that may not be economic in anybody's lifetime in this room. But in effect, we have 159.

Now don't mistake that—and we've tried always to say, following right on the heels, the potential, however, we feel for domestic gas reserves in the United States are approaching and exceeding 700 tcf, or over 50 years.

We think there's a tremendous potential supply out there if the proper economic incentive is given to recover those reserves.

We've tried to say on a number of occasions that deregulation of wellhead would add 40 to 50 tcf. So we think that there's some potential there.

And that's of relatively inexpensive supplies. We think there are abundant domestic supplies. There are large gas finds being made.

But we do not expect, and I think you should understand that inherent in our support for S. 85 and in this discussion, we do not expect natural gas to take over the market of electric utility base load generation.

About 10 percent of base load electric utility generation is natural gas oriented. It's about 55 percent coal.

What we're talking about here is whether gas can make a contribution toward future technologies and intermittent steps to when coal can take a role in a more clean burning way and the IGC technology, that will make it a less expensive fuel for consumers and a less expensive transition.

We think there will be abundant resources to do that. We don't see in any event how, if you keep the Fuel Use Act on and deny gas future marketing opportunities, how that won't just hasten the day that you deplete your reserves.

Because if you're not going to give the incentive at the wellhead, and you're not going to give the incentive to explore at the end use, you're just going to have a complete—you're going to exacerbate the depletion of the reserve even quicker.

Senator METZENBAUM. As I understand your argument it is that if you have the incentive to produce more, there will be more produced.

And yet the Oil Daily had an article—I'm not sure of the date—in which they state: Based on current ratios of gas completions to total wells, approximately five million wells would have to be drilled to realize the American Gas Association estimates of 647 trillion cubic feet, he noted, Mr. Ed Story, vice chairman, Conquest Exploration Company.

It went on to say: At the current rig count, that would take over 700 years, which is totally unrealistic.

Now, I have difficulty in understanding where all this gas is coming from. As long as I've been in the Senate, and before that as well, I have constantly heard ups and downs as the amount of gas that was available.

And if it served the purpose of the gas industry to say that there were tremendous amounts of reserves available, they said that there was a tremendous amount of reserve available.

If it served their purpose to say that we're facing a shortage, it's a finite supply—and I remember their using that term so often—then they've said that.

And frankly, I'm one of those in this body who has come to question the representations that the Gas Association makes vis-a-vis the question of present supplies and future supplies of natural gas.

And I'm concerned about the nation's security vis-a-vis that question.

Mr. BUSH. I appreciate your concern, Senator. I just have to tell you—of course, Mr. Lawrence can speak for the American Gas Association, but as far as I'm concerned, I don't think producers have ever been inconsistent in what we've told you in 1977, 1978; we were arguing with Dr. O'Leary and Dr. Schlesinger who said it was a finite resource; we were going to run out in 1979. And we had to take it off a box at a time.

And we said at that point that we had abundant supplies of natural gas, and if allowed to explore for them, we would have an opportunity. Inexhaustible is not the word to use. But we certainly have an abundant supply that—at least cost right now. We don't find that particular wonderful.

But they're abundant. They're inexpensive. Gas should be encouraged. We should encourage the development of it.

And separate gas from oil, if you would. Every mcf of gas, as every study that the Congress has received, backs out, the usage backs out imported oil, particularly where price sensitive customers are involved in industrial and electric utility use.

So I think there are distinct, real advantages that can be gotten for the nation by letting economic choices in the end use take place.

I don't think that it's going to drive the kind of concern that you have that we're not going to return to a time where we have 1977, 1978 types of discrete shortages that were a product of policies before them.

You know, there was a 2 tcf overhand in the intrastate market in those days.

So I appreciate your concern. But again, I think coal is going to, when it's economics drive it, it's going to have the stage.

Senator **Metzenbaum**. What is your projection as to the amount of Canadian gas that will be coming in during the next 10 to 20 years?

Mr. **Bush**. Well, we haven't projected it, but they have large available supplies, and if they stay as price competitive right now as they are, I believe that this nation will be asking our friends from Canada for the supplies.

I think it's going to want to use them. The question is to keep the mix so fluid that we don't work ourselves back into the position where any one government, whether it be Canadian or any other government, would be tempted to try to handle the price to our disadvantage.

But the key to doing that is making sure that we have as much flexibility in the system as we can. And I think that that's been the key of what we've been trying to say about repealing the Fuel Use Act.

Senator **Metzenbaum**. Mr. Farrand, has the Coal Association arrived at any estimates as to what repeal of the Fuel Use Act would mean for coal and gas demand?

Mr. **Farrand**. No, we have not. I have heard some estimates that other people have produced about whether there could be as many as 3 tcf additional in utility gas use. We have not translated that into coal use.

I will say that I have seen a report with respect to the exemption applications on file with the Department of Energy that if all of them were approved that they would translate into somewhere between 12 and 40 million tons of coal production a year.

Senator **Metzenbaum**. Senator Domenici?

Senator **Domenici**. Mr. Chairman, I don't know if in my absence the question was asked with respect to the Vepco site, were you asked about that, Mr. Farrand?

Mr. **Farrand**. No, sir.

Senator DOMENICI. Now, I could be wrong on the facts. But I understand what your position is with reference to the regulatory process working its way. And obviously a number of permits are being granted.

And then you have stated your association's position with reference to how we should judge the exceptions that permit the use of natural gas.

It's my understanding that there's a facility that Vepco intends to build, with the construction of turbines, on a site which already has coal handling facilities. From what I understand, it fits the definition that you all have been telling us you think we ought to be following, and you're objecting to it.

Is that an erroneous statement or not?

Mr. FARRAND. I regret to have to disagree, but that is not the statement. I think the concern there with respect to the Vepco filing is not so much against the utility's decisions but the cost tests that the regulations promulgated by the Department of Energy apply to it.

And I would capsulize it this way. In following the regulations, the utility used pricing indices for both oil and coal, and the price indices that they used for oil resulted in an estimate that they would pay currently $12.50 a barrel, and that it would escalate up to no more than $6.40 a barrel by the year 2020.

With respect to coal, they escalate the coal prices in comparing what a gas plant and a coal plant would cost over the life cycle, they escalate coal prices at one percent above inflation per year for the duration of the plant.

In fact, coal prices have declined in relation to inflation by——

Senator DOMENICI. Well, help me with this, because I did say that I was not certain that this was an inconsistency in your position. I started it this way, so help me for a minute.

I don't understand the relevancy of your explanation. So could you just give me the primer, why is your explanation relevant to your opposing it?

Mr. FARRAND. Well, our position, Senator, is that if the fuels can compete, then that's fine with us. We want to lift the ban on the artificial constraint against gas use; but that they ought to compete by some realistic analysis.

And that what Vepco used, for what reasons I cannot determine, was a very unrealistic cost comparison dictated not by the PUC, not by the utility management, but in fact by the Department of Energy. Totally outdated indices that they were required to use in doing their cost comparison.

Senator DOMENICI. So aside and apart from the Fuel Use Act and your position that you would support it if—and then you've given us your if—you are saying that in the current status of things, where somebody applies under current law for the exception, you are saying that part of that process, you get involved in trying to encourage the permit entity to consider the economics of the situation?

Mr. FARRAND. Sure. They came in and filed for a cost exemption under the current law. And if they can use real numbers and prove that it's cheaper to use gas, we're satisfied with that. But the fact is they used what I think would be considered patently unrealistic numbers in making those assumptions, and we're questioning the use of those indices.

Senator **Domenici**. I have just one last observation. I have made the point heretofore that natural gas may indeed become a very vital ingredient in our efforts to solve the acid rain problem.

I have before me a most interesting article by William Ruckelshaus, where he talks about the existing Clean Air Act and our efforts to clean up acid rain, and the rigidity imposed in terms of fuel mixing and concludes that one way to address the issue in a more economic manner is inhibited by the Fuel Use Act itself as industries look at and as utilities in a State like Ohio, say, look at trying to dramatically reduce their SO_2.

Do either of you have any impressions on that, and especially for you, Mr. Farrand? If you do not, I would greatly appreciate your reviewing this article and commenting for the record as to what you see about this position on the part of Mr. Ruckelshaus, one way or another, and what it really means as you see it.

Mr. **Farrand**. I think the position that we're advocating with respect to the Fuel Use Act would in fact eliminate that constraint, and would provide the flexibility that the article attempts to promote.

Senator **Domenici**. Mr. Chairman, I want to ask you to make this a part of the record, this Ruckelshaus statement. It's not very long. And I frankly know that you do have, in this Senator's opinion, a reputation of looking at things in great detail, and asking your marvelous staff to check into things.

And then you have, and I'm being honest with you, you have established with me a reputation of seriously discussing serious issues if they're presented with objectivity.

I really urge on the issue of acid rain, which is obviously an enormous problem for your state and this nation, that Mr. Ruckelshaus'opinions be looked at by you, and that as we look at this Fuel Use Act repeal, that you consider his thoughts about the possibility of the Fuel Use Act in its current status being a significant inhibitor on the reasonable cleanup—reasonably priced cleanup of SO_2 in the heavy, heavy states.

And I don't say it with anything other than, I believe it makes sense. I don't know how to do it yet. But I think the Fuel Use Act is one of the inhibitors, not singularly a cure. And I would urge that you consider it.

And thank you for the time.

Senator **Metzenbaum**. I appreciate the comments of my colleague from New Mexico. We will include the article in the record. The Senator from Ohio will look at the article. And I want him to know that although Ohio's very sensitive to the question of acid rain, I share your concern.

It is a problem. It's a challenge. I'm not sure how we solve that challenge. But I share your concern about it.

Senator **Domenici**. Thank you very much.

[The article referred to follows:]

Introduction

[redacted]
Perkins & Coie
Administrator, U.S. Environmental Protection Agency,
1970-73, 1983-85

[redacted] Those advantages are site-specific, and are gaining in acceptance and understanding around the country. There is no question that, under certain circumstances, select use of natural gas with other fuels—whether oil or coal, whether combined in one system or boiler, or averaged under an EPA approved bubble—makes environmental and economic sense.

The product of natural gas combustion is much lower than other fossil fuels in SO_2, the major precursor of acid rain. It is much lower in particulate matter than competing fossil fuels. It is much lower in carbon monoxide than competing fuels. In many cases it is lower in nitrogen oxides than oil, and in most cases than coal. In the case of hydrocarbons, much of the product of combustion of natural gas is a non-reactive hydrocarbon which does not combine with NO_X to form smog.

Natural gas is unquestionably a clean fuel. It is also, in many cases, a cheaper environmental solution than using other fossil fuels and attempting to clean them. To achieve ambient air quality standards, it can be implemented very quickly. Oil-fired facilities often already have access to natural gas, and certainly this access can provide results more quickly than the technological fixes which often take years to put on line. And it is cheaper than the operation and maintenance of these technological controls once they are installed.

For some time, we have resisted using gas because we thought it was in short supply. The assumptions that led to that view now appear to be wrong. If, in the past, it would have been possible for me to say that natural gas was almost unlimited in its abundance there would have been very little doubt in anybody's mind that it was the environmentally preferred fuel versus certain of the other fossil fuels for all kinds of uses. Consequently, we need to look seriously at natural gas as an alternative to other forms of fuel, or to its mixture with other fuels, because of the significant economic and environmental advantages associated with its use.

Significant progress has been made in reducing pollution from stationary sources in this country. Take, for example, the problem of sulfur oxide emissions. The Policy Analysis Group at EPA was asked to make an estimate of where we would be today in terms of sulfur oxide emissions if we had continued to control pollution as we had back in 1970. Where would we be in terms of emissions in the 31 states east of the Mississippi and bordering it on the west—the states normally identified as the major sources of SO_2 and acid rain in the east?

We currently produce about 23 million tons of sulfur oxide a year in that 31-state region. The best estimate EPA could come up with was that about 41 million tons would be emitted annually in the same 31-state area, had we done nothing. So, we have actually reduced the emissions of sulfur oxides from their peak in 1973 by about 23 percent over that 10 year period—a major achievement.

These earlier efforts in the air pollution struggle dealt with pollutants that were close-in to the source and that were causing identified environmental and health problems. The country logically addressed close-in sources of air pollution first so as to reduce the ambient concentrations of these so-called "criteria pollutants" to avoid the impact on public health and the environment. We have made enough progress against our early-identified environmental problems; we should really be moving on to the next generation of problems, of which the long-range transport of air pollution is certainly a major one.

What we have been discovering over the last several years is that at least one of the solutions used to address the close-in problems—namely, dispersion of these pollutants over a wider geographic area by means of tall stacks and other techniques—didn't totally alleviate the environmental impacts. We are now uncovering impacts of the longer-range transport of these pollutants, and this fact is crucial to the acid rain debate.

It is also becoming apparent that the long-range air pollution transport problem does not stop at acid rain, but extends to all air pollutants. Whether it be the precursors to acid rain (SO_2, NO_x), whether it is NO_x that combines with hydrocarbons to form the photochemical oxidants of smog, whether it is particulates (and sulfates make up as much as 50 percent of particulates in some parts of the east)—all are part of the long-range pollutant transport problem.

As research allows us a better understanding of the total impact of this problem, and as we begin to develop strategies for reducing those pollutants, it becomes clear that the use of natural gas is one of the options we should be exploring. And, I wouldn't restrict this solution to the long-range transport problem. Natural gas can be used to control these very same pollutants close-in. While natural gas can address the close-in problems of sulfur oxides, ozones, carbon monoxide, nitrogen oxides and particulates, probably the biggest potential use for natural gas is in addressing the long-range transport problems. Natural gas in a select use mode can be a very useful and cost effective way to achieve ambient level requirements. It needs only be implemented with intelligence around the country.

Why don't we use it more? I think there are a number of reasons. The Fuel Use Act, which was passed back in the mid-70s, was aimed at limiting the use of gas in very large installations, whether industrial boilers or utility boilers, on the grounds that it was in short supply and as a preferred fuel should be reserved for other uses. That may or may not have made sense at the time, but again it was the result of gas price regulations and our perceptions regarding gas supply.

There are many potential uses for natural gas which are still effectively inhibited by the Fuel Use Act. There should be a rigorous review of the logic behind the Fuel Use Act, and if such an examination shows that the thinking of the mid-70s no longer applies, those provisions which prohibit the use of natural gas should be repealed and the marketplace be allowed to judge which type of fuel is preferable.

The Fuel Use Act in its application to natural gas—which is illogical economically, and certainly illogical in its limitation of a tool to control air pollution—is a prime example of what happens when the government intervenes in a given area. There are, of course, things that the market system simply doesn't regulate properly. But where there is an area in which the market will work and which will, if left alone, provide both economically and environmentally sound answers as it would in this case when coupled with environmental regulations—government should step aside.

The Fuel Use Act points up the fact that it is difficult to get the government out of an area once it is in. Advocates are created for the regulatory process, and they have a vested interest in the continuance of that process. There is reluctance on the part of legislative bodies to review their decisions once they have been made. Environmental laws are replete with examples of this kind.

We have found, over the years, that if we develop a government program, particularly a massive program with a target in mind, we may or may not hit the target we're aiming at, but we are certainly going to hit six we haven't aimed at. In any event, it is clearly time to review the logic behind the Fuel Use Act. If it is no longer valid, then repeal it.

There is also a built-in bias in our environmental laws against fuel switching, as opposed to technological fixes as a solution to the problem of air pollution. Environmental laws are full of examples in which Congress has prescribed the solution to a problem as opposed to describing the problem and then permitting the administrating agency to set performance standards and, to the extent possible, maximize choice as to how those standards can be effected.

The percentage reduction, rigid Clean Air Act amendments of 1977 are typical. These, in effect, mandate the use of scrubbers for new coal-fired installations nationwide regardless of their impact on the environment and regardless of the advisability of using lower sulfur content fuels. The fear that lies behind this is that when economic conditions change it is simply too easy to switch back from the preferred fuel, which would then result in a lot of environmental degradation. The whole issue of backsliding often surrounds the legislative debate over environmental laws.

It must be acknowledged that switching back from the preferred fuel to one which has a far greater impact on the environment is always a possibility. On the other hand it is also possible to switch out of a technological fix if economic conditions become severe enough. It is, after all, expensive to operate a scrubber. It is expensive not only in the operation and maintenance of the scrubber itself but in handling the sludge.

There are a lot of reasons why even after technology is installed, a given user of that technology could, in effect, backslide. So, I don't find that argument particularly persuasive as long as we assume that the country is going to continue to regulate the use of various kinds of fuels in protecting public health and the environment.

Senator **Metzenbaum**. Senator Melcher.

Senator **Melcher**. Thank you, Mr. Chairman. In our state we have tremendous amounts of coal reserves that are counted as reserves. And we know how to do that, with the guidelines that the Department of Interior uses.

But we have an unknown quantity of natural gas also. And those reserves of course can't be counted. Some of it in the overthrust, and some of it very shallow production.

But the market is off on natural gas, so there isn't much exploration or much development going on.

And I don't know whether passage of this bill will stimulate enough demand or will be much of a factor in increasing natural gas production in Montana.

However, we get to one point here between the two of you, Chris and Nick, and that is whether this should be coal capable if a provision added to the bill is an amendment, if the bill should pass. So that is all my question is going to be about.

Chris, I do not suppose that Peabody is a member of the Electric Power Research Institute, is it?

Mr. **Farrand**. No.

Senator **Melcher**. I assume you follow it rather closely? Is that true?

Mr. **Farrand**. That is true, and we are engaged in a number of projects as a joint venture partner primarily to develop clean coal technologies and in one instance to develop an integrated gasification combined cycle unit.

Senator **Melcher**. Well, Nick Bush includes in his testimony Appendix A from the Electric Power Research Institute study. They published it in their journal last September. What I am concerned about is that the capital and the fixed and variable operating and maintenance costs of a gas combined cycle plant as compared to a coal-gasified combined cycle and the capital and fixed and variable costs that would be involved with that type of plant.

That is a very telling difference, as you know, very significantly about 40 percent cheaper for bus bar cost of electricity.

Now, that is too significant to ignore, and surely do you not believe that we must consider the economic justifications of an amendment of a nature that would place that cost by statute in the marketplace for consumers of electricity, Chris?

Mr. **Farrand**. At the risk of gross generalization, the rule of thumb is that a full coal facility has a life cycle cost divided into about two-thirds capital and one-third fuel, and an oil and gas facility generally has the reverse, about one-third and two-thirds and obviously far lower capital costs.

I want to emphasize, however, that we are not talking about a full coal capable facility. We are talking about the minimum design characteristics so that the plant could at a future date with additional equipment become coal capable, the minimum and no more, and I question whether that number is 40 percent.

Senator **Melcher**. I do not know. That is why I asked if you followed it.

Mr. **Farrand**. I think the common rule of thumb, and I think Nick and I would agree, that that number for a boiler facility is probably in the neighborhood of 25 percent. I think for the first element of an integrated combined cycle unit, i.e. the turbine itself, is a very small fraction. I do not know exactly what that is, but I have a dollar estimate but I just do not know what the initial capital cost from the turbine is so I cannot give you a percentage.

Senator MELCHER. You know, you work with the Electric Power Research Institute on some joint ventures, and this is a pretty solid argument here on the table, this Appendix A of Nick's testimony. It comes from EPRI. If you think there is a better rebuttal to it, I would like to have it.

Mr. FARRAND. I would emphasize again, and not having seen his appendix or his testimony, that as you relate it to me it appears to be the difference between a fully coal capable unit and a gas or oil unit. I emphasize again that is not what we are talking about. We are talking about something substantially less than that.

Senator MELCHER. Nevertheless, if you can rebut it I would appreciate it, because I think it poses a question.

Mr. FARRAND. There is a penalty cost associated with what we propose, and the question is how high is that penalty cost. We would argue that whatever it is, it should be the least amount technologically that can be arrived at.

Senator MELCHER. Well, the question, however, was should it be imposed by statute, an artificial cost in the marketplace for those buying the electricity. I think that is a pretty basic question.

Mr. FARRAND. Well, that is part of the question, Senator. The other part of that question was illustrated by the answer that the PUC chairman gave earlier this morning, and that is that he might not see fit to approve those costs. So the real question is are we as a matter of national policy, if the PUCs will not agree to declare that a prudent expenditure, going to for expedience sake lock ourselves into a considerable element of capacity that does not have flexibility. That is also the question.

Senator MELCHER. I think it is fair to say that your use of the word expedient is a little bit self-serving there. The question of dollars is always considered pretty personal, and it is still the basic question do we impose by statute an artificial cost that would not otherwise be there, because after all they can make that choice in building a plant.

I recognize the answer you just said about the former witness' testimony, but nevertheless this would by statute require that cost to be locked in. I think it is a basic question each of us on this committee has to ask ourselves when we consider the amendment.

Mr. BUSH. Senator, I think you are going to hear witnesses following us who are going to say in effect that utilities are not locking out coal capable plants.

I just do not think that is going to hold water, because they are making decisions to eventually have that capability.

Senator MELCHER. Thank you, Mr. Chairman.

Senator FORD. Mr. Chairman, I have one question if I may for Mr. Bush. I understand the time is running, but I am willing to stay awhile. They call me Old Iron Bucket.

Mr. Bush, one New York distribution system, as I understand it, has replaced its suppliers of natural gas and they are now getting 50 percent with direct long-term purchases from producers and marketers and 50 percent in long-term supplies from Canada. That question was asked of you a while ago. That popped to me, and I went to look at some of my notes here.

The producers here warned, "Canadian suppliers will be the leading edge of higher prices should the gas bubble burst."

Do you agree with that?

Mr. BUSH. Yes. I think it is a real serious concern, but how by keeping the Fuel Use Act down——

Senator FORD. I just ask you the question, and you just give me a yes or no. I do not have to elaborate on the Fuel Use Act. You have testified lots of times, Nick. I can go back and get some of your testimony. You are one of the experts.

Mr. BUSH. We will be consistent. We have always said that we are going to need Canadian gas in the future, and we would like to maintain our good relations with Canada because I think as a nation we are going to have to depend upon those supplies at some point. The trick is how to keep them economic.

We have tried to always say that the way to do that is to maintain as much flexibility and discipline of economic choices at the end use.

Yes, we are concerned, yes.

Senator FORD. Let me just say to you the reason I brought it up, Canada is really putting it to us. We see long-term energy contracts with two states. A contract is bid for energy, and they say whatever your lowest price is less 20 percent. The first thing you know, the natural gas that you have and the supply you have is going to be locked out.

So I would say that you better look at this for your own good because we have a new entrant into the field when we start the embargo, if we ever get another one, and I pray we never have because I was here, and we may have to make some of the decisions. We stayed on Christmas Eve and tried to work these things out with you experts to see if we could get it done.

I just think you better look at this new ingredient and be sure that when we look at import fees—oh, we hear a big clamor for import fees. Now we hear the other argument on the other side of the coin. Let the marketplace work. Well, there are lots of things going on here that I want to talk about, but Canada is a new entrant into this field and as a larger player than it ever has been before.

When we begin to talk about acid rain, there are more Canadians in Washington lobbying for acid rain legislation than there are Americans, and I think it is about time we begin to look at where the crunch is coming from and be darn sure that our borders are not invaded.

[Laughter.]

Senator MELCHER. Senator Nickles.

Senator NICKLES. The general is wound up today.

[Laughter.]

Senator NICKLES. I may help you on acid rain if you will help us on natural gas.

Senator FORD. You better be careful. You are on record.

[Laughter.]

Senator FORD. You have been on record before, Don, remember?

Senator NICKLES. We have been on record a few times on this little issue.

Mr. Chairman, I know the time is late and we have other panels. I will just make one quick question to Mr. Bush, and that concerns the elite lobby that Senator Heinz alluded to.

If the natural gas lobby is so darned elite, why are you the only industry that has price controls on your product and has end use restraints on selling your product?

Mr. BUSH. We have formidable opponents. We have not been able to persuade people aggressively enough, I guess, that it is probably in their best interest, but I am sure that Senator Heinz was perhaps being overly exuberant in his description of what the famed gas lobby is supposed to be.

I think we are here to try to say that this is not a fight with coal over whether or not coal or gas is eventually going to be used. We are confident that the Nation is going to need plenty of both, and we are going to need a lot of help from Canada as well, though I would like to talk to you, Senator Ford, sometime about as-billed in Canadian and natural gas because I think you might give us a real hand there with helping with something there.

Senator FORD. Are you a horse trader?

[Laughter.]

Mr. BUSH. It depends which end of the horse.

[Laughter.]

Senator FORD. Well, down home we try to stay out front.

[Laughter.]

Mr. BUSH. I am not going to match you, Senator.

Senator FORD. I always enjoy you, Nick. You just keep it up.

We have a vote on.

[Laughter.]

Senator NICKLES. Mr. Bush, is there any other commodity in the United States that you can think of, energy or other, that the Federal Government either regulates the price or has a statutory prohibition or restriction on its end use sale?

Mr. BUSH. No, sir.

Senator NICKLES. I concur with that. Thank you very much.

Senator FORD. Mr. Chairman, how about all the agriculture marketing orders? I just throw that up for agriculture.

Senator MELCHER. Thank you very much, Mr. Farrand, Mr. Bush.

This committee stands in recess for 10 minutes. I want to make it clear that we have done very well. We have heard four witnesses in about two hours and 15 minutes, and all we have to do is hear eight more witnesses in the next 15 minutes. Although Senator Ford has indicated his willingness to stay over, the Senator from Ohio is not in a position to do that beyond.

We stand recessed until about 11:55.

[A brief recess was taken.]

Senator METZENBAUM. Gentlemen, we have a five-minute rule. Even with that I do not know how we are going to finish. We will first hear from Mr. George Lawrence, and I think what we will do is hear all of the witnesses first before taking questions.

Mr. Lawrence.

STATEMENT OF GEORGE H. LAWRENCE, PRESIDENT, AMERICAN GAS ASSOCIATION

Mr. LAWRENCE. Thank you, Mr. Chairman, Members of the Subcommittee, and the Committee.

AGA strongly supports S. 85. We applaud you for these timely hearings, and the Full Committee for its mark-up scheduled on March 25. Repeal of the Fuel Use Act and incremental pricing, as in S. 85, may be controversial as stated, but it is an issue whose time has come.

There are three major public policy issues facing this Nation: national security, the environment, and competitiveness in international trade where the tremendous U.S. natural gas resource base and the repeal of restraints on its use can make a major contribution to all three.

In the case of energy security for this Nation, we are talking oil import vulnerability and electric reliability. Now the opponents of Fuel repeal and those who would impose a statutory coal capability requirement state their concerns over natural gas supplies. We hear that very often from our competitors in the energy marketplace.

They point to the regional shortages of the 1970s, but things have changed dramatically since then starting with the successful effort by the Senate Energy Committee, including many of its present Members, which in 1978 began the now complete removal of Federal field price controls on all new gas exploration and drilling and removed inter/intrastate barriers.

Development of the huge natural gas resource base can now respond to market forces, and we have ample evidence that the industry can and will respond. The million-mile-plus delivery system has been expanded. It has been improved. It is more flexible today than ever before. Storage capability has increased 50 percent. Let me give you an update by the AGA Gas Supply Committee, which has issued biennial projections since 1976 and is dated just a couple of weeks ago.

"There will be a steadily increasing supply of U.S. natural gas through the year 2010 under all reasonable energy price scenarios," William T. McCormick, chairman of the American Gas Association Gas Supply Committee, said. Now that is the same Bill McCormick who is chairman and CEO of Consumers Power Company of Jackson, Michigan, which recently announced plans to convert the Midland nuclear power plant to a major natural gas fuel combined cycle co-generation project.

Natural gas supply is not the problem. Our problem is demand. The reduction in gas demand and the oversupply situation has created severe disincentives for natural gas exploration which is contrary to the long-term national interest. It has created the severe take-or-pay problem between gas pipelines and producers which could have a direct impact on 160 million gas consumers. But the new market opportunities which Fuel repeal will permit do not just benefit the gas industry.

What we are urging is another option, not a panacea for everyone but an option that electric utility management and industrial users should have, one that offers new technologies, highly efficient, environmentally benign, economic, and timely electric power generation that will benefit two industries: the natural gas industry, and the electric industry, and the customers of both.

By the year 2000 coal consumption will increase with or without the Fuel Use Act. The new gas demand will not stop increased coal production in this country. The new high efficiency gas turbines and select use of gas with coal will replace or upgrade not just conventional coal boilers but less efficient conventional natural gas and oil boilers as well.

On the issue of coal capability, most new power plants are already designed to use a backup fuel. Advocates of coal capability want to mandate that the backup fuel must always be coal, but this would discourage new power plants from choosing gas in the first place because of life cycle economies that pit the higher fuel costs of gas versus the higher capital costs of coal.

The issue of coal capability is a valid one, as is that at any backup fuel, but it should be left to the utility plant operators or industrial users who are best equipped to make the decisions at their own plant sites in their own customers 'best interests.

Government mandates are typically controversial and cannot keep pace with environmental and technological changes. They have not worked, and it just is not government that is good at this. Company A in New England cannot make sensible judgments on coal capability or any other backup fuel consideration for Company B in Virginia. In short, coal capability decisions should be left to the most capable decision makers.

Again, Mr. Chairman, we strongly support S. 85 without any coal capability amendments. Thank you.

[The prepared statement of Mr. Lawrence follows:]

TESTIMONY OF GEORGE H. LAWRENCE
PRESIDENT
AMERICAN GAS ASSOCIATION
BEFORE THE
SUBCOMMITTEE ON ENERGY REGULATION AND CONSERVATION
COMMITTEE ON ENERGY AND NATURAL RESOURCES
UNITED STATES SENATE
ON S. 85
REPEAL OF THE POWERPLANT AND INDUSTRIAL FUEL USE ACT
AND TITLE II OF THE NATURAL GAS POLICY ACT
March 12, 1987

Mr. Chairman and Members of the Subcommittee: I am George H. Lawrence, President of the American Gas Association (A.G.A.). I appear today to express the natural gas industry's support for repeal of the Powerplant and Industrial Fuel Use Act of 1978 and the incremental pricing program set forth in Title II of the Natural Gas Policy Act.

A.G.A. is a national trade association comprising nearly 300 natural gas distribution and transmission companies. Together, these companies serve 85 percent of all gas utility customers and account for more than 80 percent of all gas end-use sales.

STATEMENT OF POSITION

In 1978, Congress enacted the Powerplant and Industrial Fuel Use Act (FUA) and the incremental pricing provisions of the Natural Gas Policy Act in response to what Congress perceived to be supply shortages in the interstate natural gas market. The FUA prohibits new electric powerplants and larger industrial facilities from burning gas as a primary energy source. Incremental pricing imposes a complicated rate and accounting mechanism that forces gas pipelines and local distribution companies to pass through to industrial boiler users surcharges on their gas rates. Both statutes restrict gas demand in the industrial sector at a time when gas producers are experiencing the devastating effects of depressed wellhead prices, excess gas deliverability, intense competition from imported oil, and gas to gas competition.

In recent years, electric utilities and industrial users have become increasingly aware of the economic advantages, environmental advantages and efficiency improvements that can be achieved by using natural gas in new, high efficiency applications. For example, gas-fired combined cycle powerplants are quickly becoming the primary technological choice of electric utilities for new, baseload electric power generation. Combined cycle plants offer electric utilities tremendous advantages because, compared to a similarly-sized coal plant, combined cycle plants have one-third the capital cost, one-third (or less) of the planning and construction lead time, and one-half to one-thousandth the environmental impact. Stated simply, electric utilities can avoid the tremendous financial and economic risks associated with building large coal or nuclear plants by building, instead, modular, gas-fired combined cycle powerplants.

Despite these advantages, FUA restrictions deter the use of combined cycle, as well as other new, highly efficient gas technologies such as cogeneration. FUA essentially requires the construction and use of less efficient, more costly methods of generating electricity or steam for industrial process needs. Therefore, FUA has a negative impact on the entire economy.

Incremental pricing also has a negative impact on the economy. Incremental pricing is an artificial mechanism that precludes the opportunity to displace imported oil, raising national security concerns. Further, incremental pricing artificially and unnecessarily distorts competition in gas markets by increasing gas costs only to boiler users that purchase gas from pipelines in the interstate market. Industrial boiler users that acquire gas in the intrastate market or under contract carriage are excluded from incremental pricing. Thus, incremental pricing unnecessarily distorts market preferences in energy markets.

For these reasons, A.G.A. strongly endorses, without amendment, S. 85, introduced by the Chairman, Sen. Bennett Johnston (D-LA), and Sen. Pete Domenici (R-NM), which would repeal FUA and incremental pricing. Swift Senate action on S. 85 would remove all of the artificial and unnecessary restraints on natural gas demand, enabling the U.S. to improve our national energy security, our environment and our competitiveness in international trade.

A.G.A.'s position in support of FUA and incremental pricing repeal may be summarized as follows:

I. FUA is based upon erroneous economic assumptions;
II. FUA causes economic inefficiencies;
III. FUA exemptions do not provide adequate relief;
IV. FUA inhibits the use of new technologies;
V. Congress should reject coal capability language.
VI. Incremental pricing encourages reliance on imported oil;
VII. Incremental pricing distorts market preferences.

I. FUA is Based on Erroneous Economic Assumptions

Congress enacted the FUA based upon incorrect assumptions about the natural gas market. In enacting the FUA in 1978, Congress assumed that the nation's natural gas supplies were declining. The FUA was designed to discourage industrial gas use, thereby saving remaining gas supplies for residential and other high-priority customers.

However, these assumptions since have been proven wrong. Passage of the NGPA in 1978 spurred new gas exploration and production activity in subsequent years. In the 5-year period prior to the enactment of NGPA (1974 to 1978), the amount of gas added to "on the shelf" proven gas reserves in the lower-48 states was less than half of the amount of gas produced from those reserves. However, in the

5-year period beginning in 1980, after the enactment of the NGPA, additions to gas reserves in the lower-48 states nearly equalled the amount of gas produced from those reserves.

Given the spectacular recovery in gas production resulting from NGPA passage, there is clearly no shortage of natural gas supplies. In fact, most experts agree that the nation has 50 years of conventional gas resources remaining. We also have hundreds of years of unconventional gas in-place, with new technology enabling the conversion to economically recoverable conventional supplies. Thus, rationalizations for continuing FUA restrictions based on gas supply shortfalls no longer exist. Indeed, gas demand is a major disincentive to producers already hit hard by depressed oil and natural gas prices.

II. FUA Causes Economic Inefficiencies

The FUA exacts considerable economic and environmental costs by discouraging the use of natural gas and favoring the use of less economically and environmentally acceptable energy sources such as coal or nuclear power. These costs are illustrated in the Appendix to this testimony.

III. FUA Exemptions Do Not Provide Adequate Relief

Many critics of FUA repeal contend that the FUA exemption process provides ample relief from the prohibitions on gas use. This contention is simply untrue. The FUA exemption process adds additional delay to those plant operators desiring to build a facility that uses gas as the primary fuel source.

Indeed, the FUA exemption process serves to illustrate the need to repeal FUA. More and more industrial users and electric utilities are realizing the benefits of using gas and are applying for FUA exemptions. The number of exemption petitions has increased in recent years. From the second quarter of 1979 through the first quarter of 1985, approximately 9 petitions per quarter were filed. From the second quarter of 1985 through the first quarter of 1986, the number of petitions filed per quarter roughly tripled to approximately 29 per quarter. In calendar year 1986, 130 FUA petitions were filed with DOE (32.5 per quarter).

Industrial gas load probably suffers greater adverse impact from plant operators that refrain from filing for FUA exemptions in the first instance. Those industrial users often are motivated by the continued and erroneous perception that gas supplies are not adequate to meet long term needs. That is, they tend to interpret the continuation of FUA restrictions as a signal that the federal government still does not trust gas supplies over the long term. FUA repeal would remove the uncertainty about the exemption process and help correct the misperception concerning gas supply.

In the past, the majority of FUA exemptions have been routinely granted. However, given recent declarations by the National Coal Association that it intends to intervene in FUA exemption proceedings, it is obvious that these proceedings will become increasingly litigious and, as a result, more costly and time consuming. This would only serve to impede the FUA exemption process and to deter the use of combined cycle, cogeneration and other promising technologies. The FUA must therefore be repealed.

IV. FUA Inhibits Use of New Technologies

FUA repeal would encourage the use of new gas utilization technologies in the industrial market, such as gas-fueled combined cycle powerplants and select use of gas in combination with other fuels, that offer high efficiency and environmental benefits. As we indicated earlier, the FUA was designed to discourage industrial energy consumers from using natural gas. An unfortunate side effect of this policy has been to deter the use of these important new, highly-efficient technologies, thereby unnecessarily increasing energy costs and reducing U.S. industrial competitiveness.

Natural gas-fueled combined cycle turbines allow electric utilities and other industrial users to generate electricity, but with greater efficiency, substantially shorter construction lead times and lower capital outlays than coal-fired or nuclear powerplants. Combined cycle turbine systems are capable of generating electricity up to

50 percent more efficiently than conventional fossil fuel boiler systems. Prepackaged combined cycle systems can be brought on line in 1 to 4 years, while coal-fired or nuclear powerplants are typically brought on line in 8 to 15 years. Finally, combined cycle systems can be built at one-third the capital cost per kilowatt of coal-based capacity and at one-fifth the capital cost per kilowatt of nuclear capacity. Combined cycle turbine systems also are more environmentally benign than steam generating stations.

Select use of gas (or "select use") involves using natural gas in combination with coal, oil or other fuels, as a method of reducing emissions. Select use is another important gas utilization technology that is inhibited by FUA. Natural gas combustion contains virtually no sulfur dioxide or particulates, and far less nitrogen oxides, nonmethane hydrocarbons and carbon monoxide than comparable combustion of other fossil fuels. Greater utilization of select use technology could help reduce sulfur oxides and nitrogen oxides which many believe to be the major contributors to the acid rain problem. However, by discouraging gas use in industrial applications, the FUA impedes the development of select use technology. In some cases, select use is capable of removing sulfur at $120/ton, one-eighth the cost of a scrubber.

Electric utility operators and industrial users should have the flexibility to use the most cost-effective energy utilization systems, taking into account all relevant factors including siting, capital costs, operation and maintenance costs, fuel supply and environmental considerations. This flexibility must not be hindered if operators are to keep their generating costs as low as possible. The FUA restricts these operators from using these new, cost-effective, highly-efficient gas utilization technologies. These restrictions should be removed to enable American industry to lower its costs and compete more effectively in world markets.

V. Congress Should Reject Coal Capability Language

Critics of FUA repeal have urged that Congress, in adopting any FUA repeal legislation, should retain the current FUA provisions that require new powerplants to be capable of using coal. We are not sure exactly what is meant by "coal capable." However, advocates of this approach portray it as a safety net to ensure that new powerplants can still generate electricity if natural gas should again become scarce.

Coal capability language should not be added to FUA repeal legislation. A coal capability requirement would essentially force electric utilities to use coal, even if it were more economically efficient to use natural gas. Although the commodity cost of coal (that is, the cost of coal as a physical product) is generally lower than the commodity cost of natural gas, natural gas competes effectively with coal because the capital and operating costs of using gas are lower than the capital and operating costs of using coal. If Congress requires baseload powerplants to be coal capable, the requirement would artificially inflate the capital costs associated with gas use. At that point, powerplant operators may as well use coal, since coal's commodity cost is lower than gas. This result would be a decisively punitive deterrent to gas use in new electric powerplants. Thus, a coal capable requirement would be little more than a smoke screen for perpetuating current FUA restrictions. Indeed, if coal capability language were adopted without a procedure for providing exemptions, the requirement actually would be worse than existing law as it applies to baseload power generation.

Also, a rigid coal capability requirement would not easily accommodate new technologies. The problems posed by such rigidity are illustrated by projects involving the select use of natural gas. Select use technology was not widely known in Congress in 1978. Legislation can rarely anticipate technological breakthroughs in a manner which permits their best use. For this reason, select use projects have been hindered by FUA.

Some argue that medium Btu coal gasification could resolve the problems associated with retaining a FUA coal capability requirement. Such medium Btu coal gas technology has been demonstrated in combined cycle generators at the experimental Coolwater powerplant in Daggett, California. Since combined cycle generators can burn gasified coal without scrubbers or other major physical modifications, it is argued that gas-fired combined cycle powerplants could meet coal capable requirements by simply providing the acreage need for installation of equipment necessary to accommodate future installation of a medium Btu coal gasifier (and related facilities). Then such powerplants would be prepared for a rapid shift to gasified coal in the event that natural gas supplies tighten.

Coolwater type technology is the only process that would allow a shift to coal. However, the economic cost of such a shift is severe. For example, in an article in the July 24, 1986 issue of Public Utilities Fortnightly, two experts on the Coolwater technology acknowledge economic impediments. The authors, Dwain F. Spencer of the Electric Power Research Institute and Peter H. Benziger of the Potomac Electric Power Company, favor Coolwater technology, but concede that "if the (electric) utility industry were convinced that natural gas prices would remain low for thirty years, it would never add the coal gasification plant from an economic standpoint." The authors estimate that, for a hypothetical powerplant which operates at 70 percent of capacity, medium Btu coal gas is competitive when the powerplant's burner-tip gas prices reach $4.50 per million Btus. This number, put forward by coal gas technology advocates, is extremely optimistic when contrasted with the cost of producing gas at the Great Plains plant - the only major commercial coal gas plant in the U.S. It should be noted that Great Plains was built on time and on budget. It is a minemouth plant that uses very low cost North Dakota lignite. On a fully amortized basis, its gas would cost about $8.00 per million Btus - Coolwater type plants would not enjoy the previously listed advantages of Great Plains. In contrast, average burner-tip prices for natural gas-burning powerplants are currently around $2.10 to $2.20 per million Btus. Thus, Coolwater technology should not be used to justify coal capability if we do not know whether Coolwater technology will ever be competitive with natural gas.

Indeed, requiring coal capability assumes that electric utility operators lack the foresight to plan their generating capacity additions properly. The decision to design a gas-fired powerplant that is coal capable should be left up the electric utility operators and the state agencies that regulate them. These operators can determine the level of coal capability, if any, that they require based upon all of the relevant factors, including siting and ability to acquire long term supplies of gas, coal or other alternative fuels. For example, coal capability would not be practical for an electric generating plant being built on an urban site where coal use is prohibited. Thus, the federal government should certainly not attempt to establish a single, arbitrary nationwide standard for coal capability because one standard cannot be appropriate for every new powerplant in every location in the country, and even in the instance when it might be appropriate, technological and economic events would likely overtake such a standard. We urge Congress to reject the coal capable requirement.

VI. Incremental Pricing Encourages Reliance on Imported Oil

Incremental pricing encourages greater reliance upon imported oil, particularly in light of declining oil prices. In the past, incremental pricing surcharges generally have boosted the price of natural gas to rough parity with the price of No.6 fuel oil. Thus, industrial energy consumers using oil as a boiler fuel were discouraged from switching to natural gas. Today, the posted incremental pricing price has not kept pace with the market due to regulatory implementation and administrative lag, resulting in load loss to oil.

Fluctuating oil prices merely exacerbate the problem of oil import dependence. Since incremental pricing surcharges are calculated based upon oil prices that are 30 to 60 days old, gas prices cannot respond immediately to quickly fluctuating oil prices. Thus, incremental pricing could cause gas customers to switch to oil, fostering greater reliance on imported oil.

Natural gas is a readily available, domestic energy source. Our nation's energy supply security would be enhanced if incremental pricing were repealed, removing the disincentive against switching from imported oil to gas.

VII. Incremental Pricing Distorts Market Preferences

Incremental pricing also unnecessarily distorts market preferences for industrial gas consumers. Incremental pricing surcharges are imposed only on gas acquired by interstate pipelines. Gas transported on behalf of industrial users and intrastate gas are not directly affected. Incremental pricing therefore provides an artificial incentive for industrial boiler fuel users to choose transportation over pipeline system sales. These incentives disrupt the market because they are motivated purely on the desire to avoid incremental pricing surcharges rather than on market preferences.

CONCLUSION

The clear and present problem facing the natural gas industry and its customers is the need to improve demand. The natural gas supply outlook is good now and for the long term. Removing these Federal statutory restraints on the use of this clean, abundant American fuel will increase natural gas demand by five to ten percent in the early 1990s and by fifteen to twenty percent by the year 2000.

This increased demand will provide direly needed exploration incentives. It will alleviate the current and growing pipeline take-or-pay dilemma. It will improve the efficient use of our energy utility infrastructure -- both gas and electric. It will reduce oil imports. It will enhance environmental goals. It will eliminate an unnecessary and growing exemption/administration bureaucracy. It will permit a domestic coal industry to better compete with foreign energy alternatives.

Senator **Ford** [presiding]. I was not here, and it looks like I have been abandoned, but you can rest assured I have some questions.

Mr. McGrath, and then I guess we will just move from my right to your left, or your left to your right.

STATEMENT OF JEROME J. McGRATH, PRESIDENT, INTERSTATE NATURAL GAS ASSOCIATION OF AMERICA

Mr. **McGrath**. Mr. Chairman, I appreciate the opportunity to appear before the subcommittee today to address S. 85 which we strongly support. INGA has testified on numerous occasions before this Subcommittee in favor of repealing the incremental pricing provisions of the NGPA and the limitations on gas use embodied in the Fuel Use Act. We have not altered our view in that respect.

INGAA supports, as I indicated, S. 85. However, we understand that the coal industry is intensely opposed to outright repeal of certain Fuel Use Act provisions. If an acceptable alternative to outright repeal could be devised that would allow the natural gas industry an opportunity to compete fairly for new industrial and power plant load, INGA could support such a compromise.

Unfortunately, such an alternative has not yet emerged as far as we are aware and, Senator Ford, we are interested in seeing your amendment when it becomes available, and we will certainly review that.

Senator **Ford**. It will be available some time next week.

Mr. **McGrath**. The Fuel Use Act provisions restricting gas use were the product of widespread concern in 1978 that natural gas supplies were dwindling and that drastic steps had to be taken to curtail its use. Whatever the merits of that goal at the time, it is clear that the underlying assumptions have been proven wrong.

Senator Ford, for those of us who suffered through the days of curtailment, the memories of the natural gas shortage of the mid-1970s is still very vivid. But these memories should not deter us from amending those provisions in the Fuel Use Act inhibiting the free choice of natural gas in electric generating stations and electric production.

The NGPA began lifting restrictions on wellhead prices so the marketplace, rather than regulation, could determine the value of natural gas. As a result of increased price and competition, we found and developed more than ample supplies of natural gas.

Moreover, the FERC has furthered competition in natural gas markets with Orders 436 and 451 and so forth. Thus the shortages of the 1970s were induced by regulations, not by any geologic shortfall.

The supply issue is not one of when the bubble will burst or how many proven reserves we have. Rather, the issue is one of trusting in the economic principles of a deregulated and competitive market. We have already been forced to take the step of faith, and we have already crossed the bridge of deregulation to a competitive market, or a largely deregulated market. All we ask is that natural gas now be given a fair chance to compete for the potential market currently sheltered from competition by the Fuel Use Act.

I cannot guarantee an infinite supply of natural gas, but I would note that in the 20 years from the first Potential Gas Committee report of 1964 until its latest report of 1984, the combined estimates of proven reserves and future resources remained at over 900 trillion cubic feet.

Therefore, are we going to rely on the competitive market to develop this resource base, or are we going to continue to impose artificial constraints on competition? One thing we have learned from the NGPA and deregulation efforts in other industries is that American enterprise is very resourceful in meeting the needs of the marketplace when given the opportunity to compete in it.

I should state that INGAA's support for incremental pricing and Fuel Use Act repeal is based on the understanding that such a bill will not become the vehicle for other natural gas provisions. The Members of this subcommittee know only too well the divisive nature of broad natural gas legislation.

If other unrelated provisions are added, we would have to reconsider our position. The availability of gas, coupled with emerging technologies for its use by industrial and power plant consumers, makes it attractive in several very important applications for which the Fuel Use Act now requires an exemption.

Three such technologies are co-generation, combined cycle power generation, and the select use of gas to reduce power plant emissions. Gas-fired co-generation is a process that allows an end user to increase the efficiency with which it uses natural gas by producing electricity with what would be the waste heat in conventional systems.

For many industrial and commercial businesses, the result is a substantial savings in overall cost. Substantial growth in gas-fired co-generation is expected in the coming years.

Another important opportunity for natural gas is combined cycle electric generators. In this process, natural gas is used to fire a gas combustion turbine which generates electricity and the waste heat is then used to generate steam which runs a second turbine and generates additional electricity.

My time is up, Mr. Chairman. I just wanted to reaffirm that we do support the repeal of the incremental pricing provisions of Title II, as well as the repeal of the Fuel Use Act limitations.

[The prepared statement of Mr. McGrath follows:]

STATEMENT OF

JEROME J. McGRATH

PRESIDENT

INTERSTATE NATURAL GAS ASSOCIATION OF AMERICA

BEFORE THE

SUBCOMMITTEE ON ENERGY REGULATION AND CONSERVATION

COMMITTEE ON ENERGY AND NATURAL RESOURCES

UNITED STATES SENATE

MARCH 12, 1987

Mr. Chairman and Members of the Subcommittee:

I am Jerome J. McGrath, President of the Interstate Natural Gas Association of America (INGAA). I appreciate this opportunity to appear before you today on behalf of INGAA to discuss repeal of the natural gas use limitation provisions of the Powerplant and Industrial Fuel Use Act (42 U.S.C. 8301 _et seq._) and repeal of incremental pricing, Title II of the Natural Gas Policy Act (NGPA) (15 U.S.C. 3301 _et seq._).

INGAA is a non-profit national trade association representing virtually all of the major interstate natural gas transmission companies operating in the United States Our member companies are both wholesalers and transporters of natural gas, moving gas from producing areas of the country to distribution companies and end users across the nation. Approximately ninety percent of the natural gas transported and sold in interstate commerce flows through more than 200,000 miles of pipeline owned and operated by INGAA member companies.

INGAA has testified on numerous occasions before this Subcommittee in favor of repealing the incremental pricing provisions of the NGPA and the limitations on gas use embodied in the Fuel Use Act. We have not altered our view.

The Fuel Use Act provisions restricting gas use were the product of widespread concern in 1978 that natural gas supplies were dwindling and that drastic steps had to be taken to curtail its use. Thus the thrust of the Act is to force a phaseout of natural gas as a fuel by powerplants and large industrial users. Whatever the merits of that goal at the time, it is clear that the underlying assumptions have been proven wrong.

The Subcommittee should understand that I do not fault these predictions for being inaccurate. Few of us in the energy field can claim to have a perfect track record when it comes to predictions. By the same token, we should not perpetuate a policy based on what have proved to be incorrect assumptions.

It is our belief that federal law should not mandate the use of one fuel over another. Experience has shown that as a general proposition, regulation has been a poor substitute for judgments made in the free market. Repeal of the Fuel Use Act would not give natural gas a statutory advantage over other fuels. Rather it will put gas on an equal footing. Repeal will leave end users free to choose the fuel that best meets their needs.

INGAA supports S. 85. We understand that the coal industry is intensely opposed to outright repeal of certain Fuel Use Act provisions. If an acceptable alternative to outright repeal could be devised that would allow the natural gas industry an opportunity to compete fairly for new industrial and powerplant loads, INGAA could support such a compromise. Unfortunately, such an alternative has not yet emerged as far as we are aware.

I should also state that INGAA's support for incremental pricing and Fuel Use Act repeal is based on the understanding that such a bill will not become the vehicle for other natural gas provisions. The members of this Subcommittee know only too well the divisive nature of broad natural gas legislation. If other unrelated provisions are added we would have to reconsider our position.

The argument is frequently made that the Act is not an impediment to the marketing of gas because the Department of Energy routinely grants exemptions from it. It is true that such exemptions have been granted regularly, but to date there has been very limited opposition to the exemption requests. Now, however, the National Coal Association has intervened in one such request and vowed to oppose such requests more actively in the future. Thus, future applicants will face a great deal more uncertainty about the timeliness and outcome of exemption requests.

In our view, utilities and industrial users should be free to choose which technology they believe is best for their needs and purposes. Similarly, the gas industry should not be precluded by statute from competing for certain markets. Emerging technologies make the use of natural gas attractive in several applications for which the Fuel Use Act requires an exemption. I will discuss three such technologies: (1) cogeneration; (2) combined-cycle power generation; and (3) the select use of gas to reduce powerplant emissions.

Gas-fired cogeneration is a process by which an end user, usually an industrial or commercial concern, increases the efficiency with which it uses natural gas to produce steam by also producing electricity from what would be the waste heat in conventional systems. The electricity may either be consumed by the business or sold to others. For many industrial and commercial businesses the result is a substantial savings in overall costs. The Gas Research Institute (GRI) as well as numerous other energy experts have projected a substantial growth in gas-fired cogeneration in the coming years.

Another important opportunity for natural gas is combined-cycle electric generators. In this process natural gas is used to fire a gas combustion turbine which generates electricity and the waste heat is then used to generate steam which runs a second turbine and generates additional electricity. We believe that the combined-cycle technology offers utilities a number of attractive advantages over other fuels.

First, the modular nature of such plants and relatively low construction and operation costs allow utilities the option of adding generation capacity in phases, avoiding the rate shock that accompanies large-scale plants. Also, construction lead times are shorter than for larger plants. Moreover, gas-fired combined-cycle plants would have less adverse environmental impact than plants using other fuels. Gas-fired, combined-cycle plants are also highly efficient, have rapid startup ability, and their modular design provides a redundancy that avoids a total generating loss if a single unit fails.

Furthermore, the combined-cycle process gives the utility the option of adding a coal gasifier if at a later date the economics warrant the use of coal rather than gas. Coal-fired, combined-cycle plants also offer superior environmental characteristics as compared to traditional pulverized coal plants. For example, the Cool Water plant in California, the first full-scale utility coal-gas, combined-cycle plant, has been called probably the world's cleanest coal-fired power plant by the Electric Power Research Institute (EPRI).

Thus we believe there is a strong market for gas-fired, combined-cycle technology. The GRI recently projected that electricity produced from combined-cycle plants could total 41,000 megawatts by 1995 and 64,000 megawatts by the year 2010. This would be about 20% of the total new capacity that GRI projects will be needed over this period (see 1986 GRI Baseline Projection of U.S. Energy Supply and Demand to 2010, p. 48). Such plants can be constructed and operated efficiently today, plus they give utilities the option of installing coal gasifiers when and if coal use becomes more economic. According to the EPRI Journal article cited above, "sixteen utilities are already conducting or planning to conduct site-specific IGCC [Integrated Gasification-Combined-Cycle] design studies. One of these utilities, Potomac Electric Power Co., has announced tentative plans to construct a phased IGCC power plant on the basis of its own study showing that such a plant would offer savings with an approximate present value in excess of $100 million."

Another potential for natural gas is its use to reduce emissions from coal burning plants. The "select use" concept has been discussed for some time and demonstration projects are under way. This technology is still being perfected, but it involves the burning of gas in conjunction with coal to achieve significant reductions in emissions of sulfur dioxide, oxides of nitrogen, and particulates. Results of experiments to date are very encouraging that "select use" may work as a cost effective technique for reducing emissions from existing powerplants burning high sulfur coal. In at least one case, the use of gas has reduced emissions so markedly that the plant is now able to burn more coal than previously. As emission limits become more stringent, select use of gas may also allow utilities to extend the life of plants that would otherwise be uneconomic. Ironically, strict enforcement of the Fuel Use Act could impede or prohibit the use of gas in such situations.

These are just three examples of how the Fuel Use Act threatens to seriously retard or prohibit the use of superior technologies that can result in considerable cost savings to consumers. Repeal of the Act will not give natural gas any advantage over other fuels, it will merely allow gas to compete on an equal footing. INGAA believes that repeal of the Fuel Use Act will stimulate badly needed new markets for gas and allow consumers the benefit of freely choosing between competing fuels.

In summary, in the long run the consumers and our economy will be best served if decisions concerning plant construction, environmental compliance, and fuel choice are based on economic, not statutory grounds.

Turning briefly to Title II of the NGPA, incremental pricing is an anachronism that does not serve any useful purpose. Congress recognized this fact when in 1980 the House of Representatives voted 369-34 against implementing the second phase of incremental pricing, which would have applied it to most industrial users. Incremental pricing was intended as a mechanism to shield residential customers from the full cost of increases which were prescribed by Title I of the NGPA. To the extent it was implemented, however, it had the effect of driving industrial users away from using natural gas altogether. This was the main reason its extension was rejected so overwhelmingly in 1980. Certainly in today's era of spot markets, transportation programs, competition between pipelines and interfuel competition, it truly is an anachronism and Congress should take the final step of repealing incremental pricing altogether.

This concludes my statement, Mr. Chairman. I will be glad to respond to any questions the Subcommittee might have.

Senator **Ford**. Fine. Thank you, Mr. McGrath.

Mr. Buckner.

STATEMENT OF MICHAEL BUCKNER, RESEARCH DIRECTOR, UNITED MINE WORKERS OF AMERICA

Mr. **Buckner**. Thank you, Mr. Chairman.

My name is Michael Buckner. I am an underground coal miner from West Virginia and a Research Director for the United Mines Workers of America. We represent about a quarter of a million retired, laid off, and working coal miners throughout the United States and Canada, and we appreciate the opportunity to be here to talk about the repeal of the Fuel Use Act.

Should the Fuel Use Act be repealed? In our opinion, the answer is a resounding “no. ’The policies that were established in response to the crises of the 1970s were correct. It is a wise policy for this country to say that we are going to use our vast coal resources to generate electricity, and that we are going to save our limited oil and gas reserves for higher end uses such as heating our homes, our schools, and our hospitals.

Now we are well aware of the economic difficulties that are occurring in the oil and gas producing States, and we sympathize with what is going on down there. We understand it because, as you know Senator Ford, we have had the same difficulties in the coal industry over the past eight years.

In 1979 we had 255,000 people working in the bituminous coal and lignite industry, and today we are down to about 168,000 people. So we have lost 87,000 jobs, and in some places the unemployment rates in the coal communities approach 50 percent. So we understand what is going on down there, and we sympathize with that.

But the current economic difficulties in the oil patch and the crises that led to the passage of the Fuel Use Act have a common thread and a common theme. That common theme is OPEC. OPEC cut off our oil supplies in the 1970s in an attempt to influence our foreign policy—no question about that. We reacted and Congress passed some laws that started a reversal of that trend.

OPEC saw what was going on and decided that the only way that they could reverse that trend that was weakening their hold on our economy was to increase output dramatically and drop the price, and that is exactly what happened when Saudi Arabia announced in 1985 th~~at they~~ were going to increase output.

Unfortunately, what happened was as the market got flooded with oil, we are developing a dangerous mindset. We have forgotten everything we learned in the 1970s, and we are going under the assumption now that we have got cheap energy forever, and that is just not the case. A wise policy for Congress to follow is if we had certain knowledge of an impending oil shock—because it is going to happen again; as soon as OPEC reasserts its control over the market, they are going to raise the prices again. We ought to start lurching from one end to the other.

The crises of the 1970s wreaked economic havoc upon the Northeast and the Midwest, and now the low prices that were created by

OPEC are wreaking havoc in the oil patch. We ought not to be playing on that OPEC yo-yo.

The proponents of the repeal argue that we have got this enormous reserve. I think it has been mentioned before that OTA has studied this and they conclude we have got 25 to 50 years left. Mr. Lawrence from the American Gas Association says with some assurance in his voice that we have got an adequate supply until 2010.

Well, 2010 is just right around the corner. If you compare that situation with what we have got in the coal industry, 478 billion tons of demonstrated reserves, that is going to last us until this country is over 500 years old.

So I think that when you look at those situations, the policy established by Congress to burn coal in large-scale applications and to reserve oil and gas for higher end uses was correct and is correct. Now for those Members who are supporting repeal because they have a genuine concern for those workers, we applaud that. We think that is a noble motivation on the part of the Members to try to help the workers in the oil and gas industry.

But those Members should know that there is no free lunch here. Helping the oil and gas industry by repealing the Fuel Use Act necessarily means that you are going to take it out of the hide of the coal industry and the workers in the coal industry.

The Gas Association has said that if you repeal this Act that you will get a 20 percent boost in their market. Well, if you look at the current usage of gas and apply a 20 percent boost to their market, it is going to come out of the hide of coal-fired generation, and that amounts to about 30 million tons of annual production.

Now depending on where that coal would be produced, a displacement of 30 million tons could mean an additional loss on top of the 87,000 that we have already lost, an additional loss of 7- to 10,000 more coal-mining jobs.

The Gas Association will tell you, no, we are not taking it out of the coal hide, it is going to be out of oil. When the electric utility sector, only 5 percent of our electrical generation comes from oil anymore, it is not going to come out of hydro or nuclear which represent about a third of our generation, it is going to come directly from coal.

So the situation that we have got is that if you repeal this Act and the Gas Association is right, gas is going to back out coal. Now other witnesses talked about the penetration of Canadian gas. I have seen estimates from the Energy Information Administration that say that over the next decade or so we are going to triple the amount of Canadian gas that we bring into this country. I think the number right now is in the range of 4 or 5 percent, and could go to 13.

So if you repeal this Act and the Gas Association is right, what you are going to do is back out American coal and replace it with another imported supply of energy, and we think that is a crazy policy.

Thank you.

[The prepared statement of Mr. Buckner follows:]

STATEMENT OF

MICHEAL BUCKNER

BEFORE THE

SUBCOMMITTEE ON ENERGY REGULATION AND CONSERVATION
COMMITTEE ON ENERGY AND NATIONAL RESOURCES
UNITED STATES SENATE

MARCH 12, 1987

Mr. Chairman, my name is Micheal Buckner. I am the Research Director of the United Mine Workers of America, which represents nearly a quarter of a million working, laid-off and retired coal miners throughout the United States and Canada.

We appreciate the opportunity to testify on proposals before this committee to repeal the Power Plant and Industrial Fuel Use Act of 1978. The UMWA strongly opposes efforts to repeal this law. We firmly believe that the policies established in response to the energy crises of the 1970s made sense then -- and still make sense today. A wise national energy policy should ensure that coal is used to generate steam for electricity and that our smaller domestic oil and gas reserves are preserved for more important uses, such as heating homes, schools and hospitals.

The UMWA is keenly aware of the economic plight in the oil and gas producing states. We understand what those people are going through because we have had the same experiences over the past eight years. In 1979, over 255,000 workers were employed in the bituminous coal and lignite mining industry. Today, there are approximately 168,000 people employed in the coal industry, a loss of 87,000 jobs. Because of the economic devastation that has visited our members, the UMWA has a great deal of sympathy for those in other industries who are struggling.

The current economic difficulties in the oil patch and the energy crises of the 1970s have a common thread and a common cause. Both are the result of actions by the Organization of Petroleum Exporting Countries (OPEC). The crises of the 1970s occurred when OPEC cut off our oil supplies in an attempt to influence U.S. foreign policy. The current problem in the oil and gas producing states stemmed from a realization on the part of OPEC that production and conservation efforts in the United States were working. OPEC made a conscious decision that the only way to reverse the trends that were weakening their hold on the western economies was to flood the market with oil and drive down prices. Thus, Saudi Arabia announced in late 1985 that it would increase oil output substantially. The result was a temporary glut of oil and rapidly declining prices.

As OPEC flooded the market with oil, an unfortunate and dangerous mindset developed in the United States. It appears that we have forgotten the difficult lesson of the 1970s and are operating under the assumption that plentiful energy at cheap prices will be available in the future. We should not be so naive as to believe that such conditions will prevail once OPEC has re-established its control over oil markets. Rather, we should conduct our energy policies as if we had certain knowledge of an impending oil shock.

Mr. Chairman, the proponents of the Fuel Use Act repeal assert that long range forecasts for natural gas are not only optimistic, but that they can be made with a degree of certainty that all but eliminates the risk of future shortages. The Congressional Office of Technology Assessment and the U.S. Department of Energy have examined natural gas supplies and their assessments are more pessimistic than those of the gas industry. There is little question that we have a current gas surplus of about 2 trillion cubic feet. However, that surplus is expected to disappear in the coming decade and we will become more dependent on imported supplies.

The OTA, in its report entitled U.S. Natural Gas Availability said "that the uncertainty of both future production and total recoverable resources of natural gas is still high, and the range of plausible gas 'futures' is greater than is generally acknowledged." OTA concluded that we have 25-50 years of remaining conventional gas resources, based on current production patterns.

In the Annual Energy Outlook for 1985, the Department of Energy's Energy Information Administration said: "Domestic natural gas production is projected to increase slightly through this decade and then to decline through 1995." EIA further concluded that "total U.S. gas reserves are expected to be 30 trillion cubic feet lower in 1995 compared to 1985."

But we need look no further than the gas industry itself for public admissions that future gas supplies may not accommodate demand for residential and commercial users of gas.

Theodore Eck, chief economist for Amoco, said last year that "the forecast is that we'll add between 7 and 10 trillion cubic feet of gas reserves a year, compared to production of more than twice that." Mr. Eck thought that level was too optimistic and that actual reserve additions would be closer to "four or five trillion cubic feet." If Mr. Eck is correct, our gas reserves could decline 10-12 trillion cubic feet per year over the next decade.

The situation with regard to gas prices is equally uncertain. Robert Thomas, the President of Tennessee Gas Transmission Company, put it best when he said: "Oil pricing is the dog and gas pricing is merely the tail." In other words, OPEC actually controls the price of gas in the United States. In the coming decade, non-OPEC oil production is expected to decline and the free world is likely to depend more on Middle East oil. Once we slide back into the economic grip of OPEC, we can anticipate substantial price increases.

Mr. Chairman, have we not learned our lesson from history? Have we really forgotten the circumstances that led to the passage of the Fuel Use Act and that were the basis for guiding utilities away from long term reliance on natural gas as a boiler fuel?

There is a great deal of uncertainty about the future availability of natural gas. While future technology may open up unknown reserves from "unconventional sources", our domestic reserves from conventional sources may last only 25-50 years.

Contrast this with the nation's coal reserves. The U.S. has a demonstrated coal reserve base of 478 billion tons. Even at minimal recovery rates, our coal reserves will last for the next 250 years. And with current technology, new power plants burn coal in an extremely clean manner.

Given the large known reserves of coal and the much smaller known reserves of natural gas, we should seek to preserve gas supplies. Gas is an inherently clean, efficient fuel that shouldn't be wasted in large scale boiler applications. Virtually anything can be used to generate steam; natural gas should be saved for higher uses, such as heating homes, schools and hospitals.

Some Members support repeal of the Fuel Use Act because they have a genuine concern about the economic difficulties facing workers in the oil and gas industry. We applaud those who are motivated by a desire to help those workers. You should be aware, however, that attempts to help them by repealing the Fuel Use Act will result in economic harm among other workers in the coal industry.

The American Gas Association has stated that removing the Act's restrictions would increase natural gas demand by 15-20 percent in the year 2000. If this is accurate, utility demand for coal would decrease by about 30 million tons. This will add 7,000 - 10,000 miners to the unemployment rolls by the turn of the century.

Employment should not be the sole basis for retaining or repealing the Fuel Use Act. Rather, such decisions should be made on the basis of rational energy policy and national security. It is irrational to use limited supplies of oil and natural gas as a boiler fuel. And we are more secure as a nation if we utilize our vast coal resources. We urge you to reject efforts to repeal the Fuel Use Act.

Mr. Chairman, that concludes my prepared statement. I would be happy to answer any questions you may have.

Senator FORD. Thank you, Mr. Buckner.
Mr. Lay.

STATEMENT OF KENNETH L. LAY, CHAIRMAN AND CHIEF EXECUTIVE OFFICER, ENRON CORP.

Mr. LAY. Senator Ford, I am Kenneth Lay, Chairman and CEO of Enron Corp. ENRON was formed by the 1985 merger of Houston Natural Gas and InterNorth. We have about $8.5 billion of assets invested in the energy business, about two-thirds of that in the gas pipeline business, we think the most extensive pipeline system in the country, and about another quarter in domestic ENP, most of that being natural gas reserves and production.

We are supporting repeal of the Fuel Use Act and incremental pricing. We believe it was probably a bad policy in 1978. In fact, dealing with the symptoms of the then-situation, not the fundamental causes, the shortages or perceived shortages in the 1970s that were largely caused if not entirely caused by artificially low wellhead prices and, probably more importantly, by very rigid restrictions on the efficient allocation of existing supplies.

Indeed, as mentioned this morning, at the very time we had shortages on the East Coast in 1978, we had surpluses in Texas and on the West Coast. We think under the current environment with now wellhead prices increasingly deregulated, and now with open access to transportation and a much more efficient allocation distribution system, that even in those kind of situations we would not have had those shortages.

But indeed, today's total environment is quite different. Instead of perceived shortages we have surpluses. We have excess deliverability. Increasingly through the day we have heard about this gas bubble about to burst. Well, this 18-month/2-year gas bubble has been about to burst for eight or nine years.

I think even recent statistics would indicate that the surplus deliverability is about as great today as it was at its peak three years ago. The big problem in the gas industry in fact has been declining demand. Demand has fallen off about 15 percent over the last five years. About 40 percent of the total consumption in this country goes to residential and commercial use. The other 60 percent goes to industrial and power plant use, and that particularly usage is declining at a fairly significant rate.

It is imperative for this industry that indeed we reverse that decline and get the gas demand back on a growth profile. We think the most likely prospect of that happening is in fact for us to be able to compete—and I do emphasize the word "compete"—but compete for new generation capability in the country.

In many cases, gas-fired combined cycle, or co-generation facilities are economically superior to coal-fired facilities, and we think the electric utility industry should have an opportunity to kind of compare all of the various fuel alternatives and capital investment alternatives to make their decision based upon economics, not based upon restrictions as to which fuels they can and cannot use.

I would just hit very quickly the supply side. I think what Mr. Lawrence and others have said is that even with known technology, known resources, there is at least a 40- to 50-year supply of gas in this country. Taking into account the nonconventional supplies, we may have, and indeed we think we have, several times that amount.

So I think the issue of supply to a large extent is an academic issue. We are currently participating in over 1000 megawatts of gas-fired co-generation around the country. In these cases it has been demonstrated that these facilities are economically superior to alternative fuel plants. That is not true in every region, not true in every market, but they are true in many markets.

It is variously estimated that with repeal of the Fuel Use Act we could see an increase in demand for natural gas in this country of at least 1.5 to 2 tcf by the year 2000. That represents about a million barrels per day of oil equivalent. We think this is virtually the only significant growth market for gas in the country.

There has been a lot of talk about the cost, installed cost, that is much less for gas-fired equipment, giving the utilities much more flexibility in putting in smaller increments as their market need them versus committing to very large megabuck plants that in many cases do not come on for five-six, seven years or longer.

Just to kind of wrap it up before my buzzer goes off there, I think indeed what we have here is the coal industry asking that it be protected from competition by the gas industry. It may be comparable to the cotton industry deciding that for some reason artificial fiber should be disallowed for shirts and thus husband the hydrocarbons that go into those artificial fibers. Or maybe in the case of the gas industry, asking that oil not be used in home heating and in fact be husbanded for use in transportation where there are scarcely few alternatives to oil.

Indeed, there are some of us in the gas industry who think coal ought to be husbanded for coal gasification in the next century.

Thank you.

[The prepared statement of Mr. Lay follows:]

TESTIMONY
on Legislation to Repeal The Fuel Use Act

by
Kenneth L. Lay
Chairman and Chief Executive Officer
Enron Corp.

Energy Regulation and Conservation Subcommittee
of the
Senate Committee on Energy and Natural Resources
Washington, D.C.
March 12, 1987

Good morning, my name is Kenneth L. Lay, Chairman and Chief Executive Officer of the Enron Corp. I appreciate the opportunity today to support legislation to repeal the Fuel Use Act.

Enron Corp is a diversified energy company. Although we hold extensive interests in oil and gas exploration and production, liquid fuels, cogeneration and the international trading of hydrocarbons, our primary business is the transportation and sale of natural gas. Our system is the most extensive in the United States consisting of over 36,000 miles of pipe, serving all types of customers in markets from California to Florida, and from Texas to the Canadian Border. Enron pipelines access all major sources of gas supply in North America.

We are committed to a natural gas industry that serves all markets where it is efficient and economical to do so. Enron believes that to encourage optimal development and utilization of our resource base and transmission systems, no market, without economic justification, should be arbitrarily lopped off from the demand screen. The Fuel Use Act does just that.

Experience on our system shows that gas use by the industrial/electrical sector benefits all gas customers. Gas demand by this sector plays a key role in balancing seasonal demands of high priority classes of customers and improves a pipelines overall system utilization factor. This practice optimizes the pipelines's unit costs of operation, benefiting all customer classes.

The Fuel Use Act was passed on the mistaken notion that the nation was running out of natural gas. The extrapolation from that assumption was that remaining supplies should be husbanded for the benefit of the residential and commercial markets. The Congress changed this assumption since 1978 when it voted in the 1981 budget reconciliation Act to repeal the off-gas provisions of the Act.

The Committee correctly judged that the Natural Gas Policy Act's production/conservation effects had illustrated the faultiness of the shortage premise. A demand prohibition based on husbanding of existing inventory for one segment of the market is based on statism and ignores the dynamics of the supply industry.

As the attached table illustrates, high priority residential and commercial gas demand is 7 TCF on an annual basis, or about 40% of total aggregated gas demand (17.8 TCF). Enron's pipeline system serves over 800 BCF a year of this market and remains committed to providing reliable service tempered by whatever direction the Federal Energy Regulatory Commission assigns to our role. This market is projected to remain relatively flat for the foreseeable future. Coupled with flat industrial gas demand and a decline in electrical utility gas consumption due to coal and nuclear facilities coming on line since the late 1970's, gas producers see a declining short term and flat long term market for their product. This market outlook provides little incentive to develop new sources of gas supply even though the potential reserve base is enormous.

Looking at gas reserves from existing, proven sources only, sufficient existing production capability (over 165 TCF) exists to serve these markets through the 1990's. Beyond this proven reserve base lies significant untapped gas resources that could exceed 650 TCF. These resources could be realized utilizing currently foreseeable technology and economics. The key requirements in accessing this resource base are recognized incremental markets for the gas and a timely commitment to develop these sources.

Artificially curtailing producers from developing this resource base by demand prohibitions on any market segment will only promote a self fulfilling prophecy of boom to bust. Flexible supplies developed for all markets gives guidance to both distribution companies and pipelines in contracting for long-term supply commitments that ensure producers of the desirability of replacing their reserves.

Gas so contracted for and aggregated for system supplies ensures that an adequate and flexible production capacity and underlying reserve base exist to serve the needs of high priority customers. To continue signals to the producing community to replace reserves, we believe at Enron in seeking incremental markets.

The real growth market for the natural gas industry as identified in the table, involves the electric generation sector. It is this market; gas-fired industrial cogeneration and gas-fired combined cycle generation that represents premium incremental uses of gas. Enron is currently involved in three joint cogeneration projects totaling 8 hundred megawatts. Enron also supplies some gas for two of the facilities. If developed, this market would spur the development of one of the nations largest economically feasible energy sources and offer utilities and their ratepayers an economic, efficient, operationally superior, and environmentally clean source of new generation capacity.

There are compelling reasons why this market development is important to utilities and the natural gas industry, as well as the nations ratepayers. This first step toward realizing these long term benefits is the removal of arbitrary market constraints imposed by the F.U.A.

While significant development may not occur until the early 1990's, the continued existence of these constraints is imposing real economic costs today. The Fuel Use Act is sending wrong signals, signals which are negatively impacting today's planning and decision making process. The F.U.A., by introducing an additional element of risk into this process, could lead to economically inefficient decisions in a number of areas with significant long term ramifications with respect to economic growth. As has been reported, a log jam of exemption applications exists at the Economic Regulatory Administration that had they been approved represent nearly 350 billion cubic feet of demand in 1986. At a time when the drilling industry is abjectedly depressed for markets, this snarl is pernicious to a major component of planning -- supply development.

As a number of studies indicate, new generation capacity will be required by a number of utilities as early as 1992/93 in order to meet customers' growing electricity needs. The decision utilities are facing is to select an optimal capacity mix from a number of competing technologies each of which has distinct advantages and disadvantages. This decision will be based on economics, financial implications, reliability, environmental concerns, assessments of risk, operational flexibility, and construction lead time considerations. Inherent lead times associated with various options, require utilities to make decisions now.

These capacity decisions should be based on a specific utility's assessment of quantifiable, real market forces and fundamental economics; not on arbitrary regulatory restrictions which are inconsistent with the reality of the market today.

Absent artificial restrictions businessmen know that competitively priced fuel must be available to them at the time their asset is utilized. The optimal mix may include any of our primary fuels. It is certain that with gas prices largely decontrolled and the FERC's Order 451 in place, natural gas will compete on the basis of market pricing.

Utilities facing a capacity shortfall in the early 1990's are now at a decision point. A new coal unit will take five to seven years for siting, permitting and construction. An alternative is a gas fired combined cycle that offers a number of economic, operational, and environmental advantages over coal and nuclear generation options.

Because of these strategic advantages, a number of utilities have expressed interest in this technology particularly in light of the flexibility provided by these units in the face of uncertain future electric demand.

Combined cycle units, because of their modular design, allow incremental sizing of capacity additions to match load growth. Capacity increments of 50-75 mw can be sequentially added as needed without having to commit to 500-1000 mw of coal capacity which will be underutilized initially and may never be needed.

This modular design also enhances system reliability by precluding a total loss of generating capacity from a single component failure. Consequently less combined cycle capacity would be required to maintain a given system reliability than would be necessary with a coal facility. Forced and planned outage rates are much lower also because of the redundancy associated with this modular design.

These systems also represent the most efficient generating option available today. Compared with full load efficiencies of 36% for a coal plant, current combined cycle designs have efficiencies near 43%. New combined cycle designs in the next few years should produce efficiencies approaching 50%. This advantage represents significant fuel savings in a cost/KWH basis. These systems also have rapid startup capabilities with full load capability within 45 minutes and partial load capability with 20 minutes.

On an installed cost basis, combined cycle capacity costs are significantly lower than those of a coal or nuclear facility ($400-$500/KW vs $1200-$1500/KW for coal and $2000-$2500/KW for nuclear). These investments are also reduced by the short construction lead times of combined cycle systems (18-24 months vs 5-7 years). Power can in fact be generated in less than one year using just the gas turbine configuration, minimized interest costs and provide a very rapid return on the investment.

On the environmental front, combined cycle systems provide greater flexibility in siting and have a minimal impact on air quality. A coal facility produces 5700, 254, and 4 times the amount of sulfur dioxide, particulates, and nitrogen oxide respectively, compared to a combined cycle system.

Finally, these systems can be modified in the future to put in place coal gasification technology if it is warranted by economics.

I believe that the various technologies should compete on their own merits, not on the basis of arbitrary fuel use restrictions. A decision by a utility today to elect combined cycle technology because of its merits requires an exemption from the Fuel Use Act. Because the lead times are one half to one third that of a coal facility, a utility could wait several more years and face less demand uncertainty. This choice, although preferable in bracketing the demand risk, presupposes an exemption is granted. A failure to receive an exemption down the road exposes the utility to its decision in foregoing the coal plant and failing to meet customer electricity requirements.

Should utility management heavily discount the likelihood of the failure to receive an exemption in the future? The decision by Virginia Electric Power to seek such an exemption today is illustrative. William W. Berry, Chairman and Chief Executive Officer of Dominion Resources announced in August of 1986 that under their new strategy of flexibility they would use a "highly efficient and economical technology" called coal gasification combined cycle generation. He noted the combined cycle technology could be adapted later for coal gasification if the economics warrant it. This would provide the flexibility and minimization of risk they desired.

The 420 megawatt facility would be the first generating facility built under the new strategy of flexibility. The National Coal Association petitioned the Economic Regulatory Administration to deny the request for exemption. The Trade Press has quoted an officer of the NCA that "We're planning on making a big hoopla over this."

The exemption outlet may appear to provide a reasoned forum for deliberation but why rely on its elusive availability when the circumstances on which the underlying base have changed so dramatically? The regulatory exemption subject to the judgement of a single administrator, and then judicial review hardly gives solace to those who must make long-term commitments for capital investment.

The Congressional judgement made in 1981 regarding off-gas is just as sound today. The long lead times for alternatives mandate that decisions today be based on the best assessment of the realities of the market and the best estimate of the future environment.

I sympathize with Mr. Berry, for his decision and those of others placed in his position, impact on the Enron planning process.

If this uncertainty is not removed I believe as the electric industry noted in its testimony before this Committee in 1981 that failure to build the necessary facilities today may encourage the continued utilization on the margin of inefficient oil plants that will actually increase our use of imported oil. This does not help us in our drive for energy self-sufficiency.

If a gas-fired generation technology is judged optimal, many pipelines will need to install new facilities in order to serve these incremental loads. Gas producers will have to develop new sources of gas reserves. Each of these decisions has significant long term ramifications and involves large capital commitments. They should be made today. Clearly, the existence or nonexistence of incremental gas markets in the future will directly impact economic growth and the development of the nations energy resource base.

Let me describe a specific situation Enron is involved in that illustrates these implications more clearly. Florida Gas Transmission Company has recently signed a Letter of Intent with Florida Power and Light to transport approximately 350 MMCF/D to existing power plants for an initial term of 15 years. This commitment will require a 200 MMCF/D increase in FGT mainline capacity, a process which was initiated in early 1985 and will not be completed until the latter part of 1988. This long term arrangement will also require the development of significant gas reserves. Real time decisions for future long term commitments.

FGT is also involved in discussions with several Florida utilities regarding incremental gas service to potential new gas fired generating facilities in the 1993/95 timeframe. Significant planning and evaluation studies are currently underway at both the pipeline and utility companies. Alternative system engineering designs are being evaluated by FGT which would serve these potential loads. These future system designs will in fact effect system planning being done now. If long term arrangements can be worked out, present system modifications can be done more optimally.

The key point here is that even though operational status may be 5-6 years away, strategies and development plans are being formulated now, system designs can be effected, and real economic costs are being incurred today. The uncertainty surrounding the F.U.A. is impacting this process now and adds a significant element of risk which must be accounted for in the development of long term contracts.

Contracts which would evolve from these discussions must address the inherent uncertainty imposed by the F.U.A. by containing regulatory "outs." Risks associated with such an "out" can be enormous and in many circumstances could preclude long term arrangements which are deemed by every other criterion to be very advantageous. On the supply side, Oil/Gas producers may delay development of significant new gas fields (i.e., Mobile Bay), because of uncertainty regarding future incremental markets.

Absent the artificial restriction of the Fuel Use Act, I strongly believe in the principle of "let the market be the test." Hard nosed managers who are directly responsible for their decisions will choose the most optimal generation facility that suits their own distinct market needs. We at Enron feel strongly enough about the efficacy of the market test, that we believe that if the generation of electricity is separated and deregulated from its distribution, risk bearers in our business will build combined cycle plants to sell into the grid.

We say to our friends in the coal industry: "You build a coal unit: We will build a combined cycle," and then we'll go head-to-head to see who will sell electricity to our friends in the electric business.

In conclusion, repeal of the Fuel Use Act is a win/win proposition. Consumers will benefit from increased and reliable gas supply, lower electricity bills based on more accurate demand strategies and better utilization of pipeline facilities. Utilities, our natural resource producers and the nation benefit because they will be able to make economically rational decisions based on real time economics. These decisions will in term allow companies like Enron to better plan its facility optimization for all its customers.

Thank you.

ATTACHMENT

	1985	1990	2000	2010
GAS DEMAND				
Residential & Commercial	7.0	7.1	7.3	7.5
Industrial & Transportation	7.6	7.8	7.9	7.6
Electrical Generation[1]	3.2	2.5	2.5	2.5
	17.8	17.4	17.7	17.6
Including Future Combined Cycle	17.8	17.4	19.2	19.1
GAS SUPPLY				
Base Supply	18.3	17.7	16.6	11.5
New Initiatives	-	0.3	3.1	8.1
	18.3	18.0	19.7	19.6

[1] Based On Current Installed Capacity

Senator FORD. Well, I might say, while I am twisting the timer here, that we are getting some support from the co-generation people.

Mr. Rothschild.

STATEMENT OF EDWIN S. ROTHSCHILD, ASSISTANT DIRECTOR, CITIZEN/LABOR ENERGY COALITION

Mr. ROTHSCHILD. Thank you, Mr. Chairman. My name is Edwin Rothschild, Assistant Director of Citizen/Labor Energy Coalition.

I am sitting here, and I would like to suspend my disbelief at what I am hearing but I cannot, because it was in this hearing room and in this Senate and on the Floor ten years ago that some of the same people, or their organizations, sitting at this table we saying just the opposite thing. In fact, I am sorry that Senator Domenici left, because he said the same thing, that we ought to be concerned about a gas resource base, and because of the concern over the gas resource base we ought to limit the use of natural gas under boilers for industrial and electric generation.

That is contained in my prepared testimony, which I have submitted for the record.

I think today we have to look at the gas resource base. I am not the one who is just saying that. I have a letter here from a producer in Louisiana who sent me the copy of the article mentioned by Senator Metzenbaum at the opening of the hearing, which was put together by the Chairman of Conquest Oil, concerned about natural gas reserves.

Gas reserves are falling. Proven reserves are falling. Drilling is way down. To think that we can repeal the Fuel Use Act on the presumption that we have sufficient supplies, which is the reason we put it in in the first place, I think is preposterous. I think Congress must be very careful before we do that to assure itself that the resources are there.

There is more than one producer in the country who is concerned about gas resources in the current market. Tenneco has expressed concern that we might have shortages next winter. In fact, John S. Harold, a highly regarded firm, analyzing reserves, oil and gas reserves and how they affect the financial pictures of various companies, has said they expect that the current price level can chop as much as 40 trillion cubic feet off U.S. natural gas reserves.

While there is still a large surplus of unsold gas in the U.S. and neighboring Canada, plunging reserves could pose supply problems in the 1990s, and so forth. I also would like to mention AGA in a recent prediction said, "Production capacity is likely to go down to about 17.2 tcf by 1990."

So there are signs all around us that there may be insufficient supplies. So I think it is premature, therefore, to repeal the provisions of the Fuel Use Act; beside which, you have a very flexible Department of Energy that has granted wide-ranging exemptions to the Act.

Our Table 2 in the back of our testimony calculates what the added additions to demand will be from the exemptions granted only since 1981 and estimated for 1987. So that by 1990—everybody likes to pick that date; it is an even number—there will be a trillion cubic feet more annual consumption because of the existing 1987 estimates for exemptions for these power plants.

So I think leaving that in place and probably tightening up might make more sense than repealing the Fuel Use Act provisions.

The other concern we have is for residential consumers. These fuel-switchable customers who are going to gas will probably be interruptable customers. Therefore, they will probably for the most part contract with producers under the current new regime we have in the marketplace, and will obtain transportation for gas. That gas will be the low-priced gas, at least in the current market.

In the meantime, residential and commercial, agricultural users, are still obtaining the highest price gas. Any look at the recent data published by the Energy Information Administration shows that firm customers, residential, small commercial customers, are not getting the benefit of the low-priced gas. It is all getting funneled to the interruptable users. So this would be another increase in demand, but it would still prevent small users from getting cheaper gas.

Finally, with respect to an issue that we have not had to confront for awhile, curtailments, the problem of putting these additional demands, this additional demand on the system during a period of curtailments so that if we do get into a shortage, the FERC no longer has jurisdiction over a large quantity of gas flowing in the interstate commerce. It has jurisdiction over gas that is owned by pipelines, but not that gas which is contracted for between end users and producers.

This would just add another level of end use that would not be subject to curtailment.

These are some of our concerns, Mr. Chairman. I would be happy to answer any questions.

[The prepared statement of Mr. Rothschild follows:]

TESTIMONY

OF

EDWIN S. ROTHSCHILD
ASSISTANT DIRECTOR
CITIZEN/LABOR ENERGY COALITION

BEFORE THE

SUBCOMMITTEE ON ENERGY REGULATION AND CONSERVATION
COMMITTEE ON ENERGY AND NATURAL RESOURCES
U.S. SENATE

ON

PROPOSED REPEAL OF THE
POWERPLANT AND INDUSTRIAL FUEL USE ACT

MARCH 12, 1987

Mr. Chairman and members of the Committee. My name is Edwin S. Rothschild. I am the assistant director of the Citizen/Labor Energy Coalition, a nationwide coalition representing over 12 million citizens who consume oil, natural gas, electricity and other fuels. We very much appreciate the opportunity to testify today in opposition to proposals that seek to repeal certain provisions of the Powerplant and Industrial Fuel Use Act of 1978.

SUMMARY

We are opposed to repeal of the Fuel Use Act for the reasons summarized below:

1. **The Precipitous Decline in Lower 48 Proven Natural Gas Reserves Demonstrates the Need to Conserve this Valuable Resource** -- Despite the current temporary surplus of natural gas, drilling efforts over the last 10 years have failed to replenish production. As a result the United States has less proven natural gas reserves than it did in 1978 when the Fuel Use Act was passed.

2. **The Use of Natural Gas as a Boiler Fuel is Wasteful When Compared to Other Uses** -- Natural gas is a premium fuel. Used directly as a home heating source or as a raw material for fertilizer and other products or as a

fuel for certain industrial processes which require its specific qualities, natural gas is used much more efficiently than it is by burning it under boilers. When natural gas is potentially in short supply, wasteful uses should be prohibited, not encouraged.

3. The Existing Provisions of the Fuel Use Act Already Allow Regulators Wide Discretion in Granting Exemptions -- Since 1978, when the Fuel Use Act was passed, the Economic Regulatory Administration of the Department of Energy has, with few exceptions, issued permits to all those seeking to construct gas-using electric-generating facilities. Given the conditions of sharply declining reserves and less regulation of the wellhead and transportation markets, there may be need for more, not fewer restrictions on such construction.

4. Because of the Transition into the New Era of Gas Transportation, Residential and Other Captive Consumers Are Involuntarily Subsidizing Large Fuel-Switchable Users -- Over the last four years the Federal Energy Regulatory Commission and most state regulatory commissions have approved rates, rules and regulations which effectively direct low cost natural gas supplies to electric utility and large industrial end users. At the same time these regulatory agencies have forced residential and other small gas consumers to purchase high-cost pipeline system supply gas. Repeal of the Fuel Use Act would further exacerbate this inequitable and costly predicament.

5. **Increasing the use of gas for electric utility use will mean an increase in the amount of gas sold directly by producers to end-users. During periods of shortage, the FERC will have no power to curtail this wasteful use of gas.** During past periods of pipeline curtailment the Federal Energy Regulatory Commission could order pipelines to curtail supplies to their lowest priority customers. But this authority has been severely weakened by changes in FERC pipeline regulation.

BACKGROUND

In passing the Fuel Use Act in 1978, Congress sought to conserve domestic reserves of natural gas and petroleum. One stated purpose of the Act was "to conserve natural gas and petroleum for uses, other than electric utility or other industrial or commercial generation of steam or electricity, for which there are no feasible alternative fuels or raw material substitutes." The Congress also sought "to prohibit or, as appropriate, minimize the use of natural gas and petroleum as a primary energy source and to conserve such gas and petroleum for the benefit of present and future generations."

Congress made these determinations at a time when there was a great deal of concern about the domestic natural gas supply base. In fact, the history of the passage of the Fuel Use Act demonstrates the broad consensus that was achieved around the need to phase out boiler fuel use of natural gas. As Senator Pete Domenici argued during debate on the conference report,

> ...almost since we first found natural gas we have been busy finding out ways to abuse it, waste it, literally throw it away on uses that we are now finding are absolutely the wrong thing to do, and basic among those uses that are wasteful and the exact opposite of what our Nation should be doing are twofold:
>
> The use of natural gas to produce electricity and, second, for large industrial boilers wherever they be, proximate to the resource or distant from it, to use natural gas as the prime source of energy in their boilers and plants.[1]

Senator Domeniciés views reflected the opinions of many spokesman for the natural gas industry and for natural gas consumers who spoke out in favor of restrictions on boiler fuel or electric utility consumption of natural gas, because such consumption is wasteful relative to other uses of natural gas. Testifying before this Committee on behalf of the Interstate Natural Gas Association of America, Richard L. O'Shields stated,

> ...INGAA affirmatively supports the conservation of energy use and the phasing out of large boiler fuel

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[1] Congressional Record, July 18, 1978, p. 21289.

> usage of natural gas for electric generation over a reasonable period of time.[1]

Another witness, Leonard H. Farmer, a vice president of Owens-Illinois, testifying on behalf of the Glass Packaging Institute, told the Committee,

> It is respectfully urged that, if the intention of this bill is to encourage conversion, attention should be directed to effecting conversions to coal from the most wasteful use of natural gas, e.g. large volume boiler use for electrical generation.[2]

In hearings held on the House side, the Chairman of the Board of the Oklahoma Natural Gas Company, C.C. Ingram, testified,

> ...Given the severe and deepening natural gas shortage, it is apparent that gas for boiler fuel must be phased out.[3]

A similar view was expressed by a vice president of the Lone Star Gas Company based in Dallas, Texas,

> We support a phase out of new large industrial boiler-fuel use of natural gas except possibly in areas where clean air standards prevent the use of any other fuel or in the rare case where no other fuel is available.[4]

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[1] Quoted in Hearings before the Committee on Energy and Natural Resources, United States Senate, 95th Cong., 1st Sess. on S. 256, June 1977, Publication No. 95-75, p. 586.

[2] Ibid., p. 540.

[3] Quoted in Hearings before the Subcommittee on Energy and Power of the Committee on Interstate and Foreign Commerce, House of Representatives, 95th Cong., 1st Sess. on Bills to Establish a Comprehensive National Energy Policy, May 1977, Serial No. 95-23, p. 597.

[4] Ibid., Statement of Carol L. Neaves, p. 601.

In short, gas industry executives, worried about natural gas shortages, overwhelming supported prohibitions on the burning of natural gas under electric utility boilers on both resource conservation and energy efficiency grounds.

Based on the analyses and assessments of various natural gas industry experts, Congress concluded that there were limits to the ability of U.S. oil and gas producers to substantially increase the proven reserves of the United States. The history of gas well drilling and reserve additions over the last 10 years has demonstrated Congress's foresight and wisdom.

DECLINING GAS RESERVES AND RESERVE FINDING RATES

Domestic crude oil and natural gas reserves have continued their inexorable decline. While the high prices of the late 1970's and early 1980's brought about a sharp decrease in consumption and an equally sharp increase in drilling, reserves continued to fall. Much of the drilling effort was expended in increasing production, not in finding new reserves.[5] In any case the natural gas reserve situation today is **worse**, not better, than the situation Congress faced in 1978.

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[5] See "U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves, 1980 Annual Report," Energy Information Administration, U.S. Department of Energy, October 1981, p. v.

> Drilling for hydrocarbons during 1980 increased 22.1 percent. However, 87 percent of this increase was expended to exploit previously discovered reservoirs via development wells, an activity which may increase productive capacity but only occasionally adds significantly to proved reserves.

Today the United States probably close to a 9-year supply of natural gas from available Lower-48 fields. With the sharp downturn in drilling that occurred in 1986 and which will continue at least through 1987, proven natural gas reserves will decline even more. As a result the temporary "gas bubble" that has put downward pressure on gas prices over the last 4-5 years is expected to burst soon. As shown in Table I with production at 16 Tcf in 1987 and with successful gas well completions remaining below 8000, new additions to reserves will probably not exceed 6 Tcf. As a result total reserves could fall to 150 Tcf for the Lower-48 states by the end of this year. Assuming reserves at the end of 1987 fall to 150 Tcf, there will have been a 24% decline in reserves since 1978 when Congress passed the Fuel Use Act. The reserve/production ratio will be less than 9 years, a ratio below the 10 year level in 1978.

The Energy Information Administration recently published an analysis of natural gas well drilling and reserve additions in which it found, for example,

> Even though almost one-half of all fields have been discovered since 1970, these fields contain less

> than 16 percent of the known ultimate recoverable gas resources in natural gas fields.[6]

In other words, the largest and least costly gas fields have already been discovered, making the likelihood of large new discoveries much lower. This is but another indication that a conservative approach to proposals to accelerate depletion of our remaining gas resources ought to be followed.

Another startling assessment regarding U.S. natural gas reserves has recently been published by the highly regarded firm of John S. Herold Inc., geologists and financial analysts specializing in reserves evaluation. The Herold findings regarding were reported in Petroleum Intelligence Weekly:

> Low prices may also chop as much as 40-trillion cubic feet off US natural gas reserves. While there is still a large surplus of unsold gas in the US and neighboring Canada, plunging reserves could pose supply problems in the 1990s, due to the long lag between a rise in prices and revival of exploration and development activity. Herold sees a probable downward revision of about 30-trillion cubic feet this year, versus an average upward revision of 1.65-trillion annually the last six years. Gas discoveries are projected at just 7.11-trillion, versus production of 17-trillion, for a total 40-trillion drop.[7]

Clearly, Mr. Chairman, if Congress believed there was a natural gas resource problem in 1978, then today's problems are much more serious.

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[6] "An Economic Analysis of Natural Gas Resources and Supply," Energy Information Administration, DOE/EIA-0481, p. xvi.

[7] "US Producers Taking the Brunt of Global Oil Slump," Petroleum Intelligence Weekly, December 15, 1986, pp. 1-2.

The current conditions of surplus are not the result of dramatic success in finding gas. Since 1978 there has not been one year when domestic production has been replaced by new discoveries. On average we have been replacing approximately 70 percent of production. As a result proven reserves have continued to decline. The current "gas bubble" is the result of a rapid decline in demand brought about by structural changes in the economy and conservation. Nevertheless, there are now an increasing number of gas producers who are worried about supply shortages in the very near future.

Ed Story, the vice chairman and chief financial officer of Conquest Exploration Co., an independent oil and gas producer from Houston, recently made a very gloomy assessment of the U.S. gas resources base. Among his observations are the following:

> • There are 79 fields with reserves above one trillion cubic feet. The last one was discovered 13 years ago in 1973 Awhile wellhead price controls were still in effectA. The seven largest were found more than 46 years ago (prior to 1940). There are 15 offshore fields and only one was discovered after 1970 (in 1973).
>
> • The percent of total wells drilled which resulted in a new field discovery of any size has steadily dropped from 2.7 percent in 1973 to just under 1 percent in 1985. These data are percent of wells drilled and therefore reflect the maturing exploration cycle rather than activity levels.
>
> ° Based on current ratios of gas completions to total wells, approximately 5 million wells would have to be drilled to realize the AGA (American Gas Association) estimate of 647 trillion cubic feet. At the current rig count, that would take over 700 years, which is

> totally unrealistic. Only 139 years would be required if the peak 1981 activity level could be maintained.[8]

Finally, Mr. Story estimates that with gross reserve additions averaging 6 Tcf per year (1986 likely total) and demand at 16 Tcf, winter supply shortfalls might be experienced as early as January 1988.

More recently, the executive vice-president of Tenneco, Inc., Joe B. Foster, stated that he believes

> "...there could be some peak day shortages in the winter of 1987-88...We have drawn down our inventory of Lower 48 gas reserves to 160 tcf from 260 tcf since 1970. The surplus has been the result of inventory drawdown, not reserve additions...Our reserve life index in the Lower 48 could decline to only 7 years of supply by the mid-1990s."[9]

BOILER FUEL USE OF NATURAL GAS IS WASTEFUL

Under conditions of ample natural gas reserves, burning the nation's cleanest and most valuable fuel under boilers to produce electricity might be appropriate. However, when Congress passed the Fuel Use Act in 1978, it recognized that because natural gas was in short supply, its use as a boiler fuel should be phased out.

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[8] "Natural Gas 'Trivia Test' Demonstrates Dim Future," The Oil Daily, June 26, 1986.

[9] "U.S. Peak Day Gas Shortages Possible In Winter of 1987-88," Oil & Gas Journal, February 23, 1987, p. 81.

There is no question that residential, commercial, agricultural and process uses of natural gas are more efficient from an energy standpoint. More of the energy contained in an Mcf of natural gas is put to work.

In recent years there have been improvements in using natural gas to generate electricity. More efficient gas turbines have been built. Co-generation and combined cycle technologies are becoming more commonplace. While these improvements raise energy efficiency from roughly 30 percent for boilers to more than 40 percent for co-generation or combined cycle technologies, they may not be enough to justify expansion given the rapidly declining level of the nation's gas reserves.

FUEL USE ACT EXEMPTIONS

When Congress passed the Fuel Use Act, it provided the Department of Energy with wide latitude in implementing the phasing out of boiler fuel use of natural gas. Up until 1985 the exemption petitions filed with DOE for natural gas fueled electric generation capacity were primarily for co-generation and combined cycle plants. According to the Economic Regulatory Administration, in 1985 the first "base load" petition was received from a utility in Vermont. And in 1986 five petitions were submitted by existing utilities for "base load" exemptions. Overall, petitions for all types of gas burning electric generating facilities increased dramatically in 1985 and 1986 and are expected by ERA officials to increase in 1987.

The increase in petitions is probably due to several factors, the most important of which have been the perceived "gas surplus" and the difficulty and cost of adding new nuclear or coal-fired electric generating capacity. For its part, the ERA has granted nearly all of the petitions for exemption from the Fuel Use Act restrictions. In other words, all those seeking approval of using natural gas for generating electricity have received such approval, making the call for repeal of the Fuel Use Act superfluous.

Because of the severe decline in proven gas reserves and the ease with which petitioners obtain approval to construct new gas-burning electric generating facilities, it would appear to be the height of folly to repeal legal restrictions on wasteful consumption of natural gas. Moreover, while repeal might not have any immediate effect, due in large part to the unrestricted exemptions generously provided by the Department of Energy during this interim period of the "gas bubble," it certainly could have a long-term effect on U.S. gas supplies.

Perhaps, this Committee, rather than spending its valuable time on consideration of legislation to eliminate the remaining Fuel Use Act provisions, ought to focus its attention on ways to conserve natural gas. In this regard, it is worth noting the likely impacts on gas supplies by the exemptions already granted by DOE. Calculating the exemptions granted since 1981, it is likely that the powerplants approved thus far will be using 1 Tcf by 1990, an increase of 500 Bcf above current levels.

If gas drilling does not increase dramatically over the next few years, such a hefty addition to gas demand could very easily create shortages of gas supply in various regions of the country. In the period of complete regulation of interstate pipeline transactions, shortages of supply were dealt with through the Pipeline Gas Curtailment Proceedings of the Federal Power Commission (now the Federal Energy Regulatory Commission). With the imposition of transportation authority the FERC's ability to allocate a shortage is dramatically altered. This committee should also recognize that as more and more large fuel-switchable gas consumers enter the market to obtain the advantages of low cost natural gas supplies, more and more residential and small commercial consumers are being denied the benefits of low cost gas and end up subsidizing the large users.

TRANSPORTATION BENEFITS LARGE GAS CONSUMERS AT THE EXPENSE OF SMALL CONSUMERS

Several months ago the Citizen/Labor Energy Coalition issued a report entitled, First to Pay, Last to Gain, in which we demonstrated that over the last two years residential and commercial gas consumers had not obtained the full passthrough of the decline in wellhead natural gas prices. This occurred because transportation authority permitted by the FERC was utilized primarily by large fuel-switchable industrial customers. Initially, the FERC did not even permit local distribution companies to participate. Now, even under Order 436, most of the gas being transported still benefits large customers, because state regulatory commissions allow local distribution companies to divert the low cost gas to the large users.

If Congress were to repeal the remaining provisions of the Fuel Use Act, it would exacerbate an already serious situation of price discrimination and anti-competitive activity. Under current market conditions repeal of the Fuel Use Act would simply permit more large consumers to obtain the lower cost gas, while residential, agricultural, commercial and other small consumers will be left with the more expensive supplies. Under both federal and state laws, it is the responsibility of federal and state regulatory authorities to protect consumers subject to the monopoly power of utilities. This has not happened. Instead, over the last few years federal and state regulatory authorities have failed to protect gas consumers most vulnerable to monopoly power. Promoting competition for the few and monopoly for the many is not what Congress intended. Repealing the Fuel Use Act would just be another step in establishing price discrimination as a national policy.

PIPELINE CURTAILMENT AUTHORITY

In the past the Federal Energy Regulatory Commission and its predecessor agency, the Federal Power Commission, were able, during periods of short supply, to curtail interstate pipelines by establishing priority categories. The lowest priority established was that of boiler fuel use and the highest priority was residential use.

By repealing the Fuel Use Act, the Congress would be encouraging electric utilities and others to expand their use of natural gas. But, unlike the period prior to Order 436, this expansion will come predominantly, in the form of direct sales by producers to end-users and, the gas will be transported under some form of transportation agreement. This gas, since it is not owned by a pipeline, will not be subject to curtailment. Thus, if a shortage arises, there is a much greater likelihood that residential and other small consumers could be deprived of vital gas supplies.

CONCLUSION

Based on the foregoing, it is the view of the Citizen/Labor Energy Coalition that Congress must not just reject proposals for repeal of the Fuel Use Act, but must instead tighten up the law to make exemptions more difficult to obtain.

Congress should also require that proven reserves are sufficient to supply existing and projected demand levels. Congress should require a minimum of 10 years of proven, deliverable reserves before providing electric utilities or others with permission to build or install additional gas-fired electric generating facilities.

Congress should require that all gas customers served via the interstate pipeline system -- both sales and transportation -- be subject to curtailment programs. This should be applied directly to any customers who receive exemptions from the provisions of the Fuel Use Act.

Congress should immediately investigate the state of the nation's gas reserves to determine whether or not they will be sufficient to support increases in demand as projected by organizations such as the American Gas Association. Congress must determine the degree to which U.S. gas producers are likely to increase their drilling activities and the degree to which gas reserves previously reported proven are removed from the proven category because of current market conditions.

TABLE I
NATURAL GAS RESERVES, PRODUCTION AND WELL DRILLING

YEAR	WELLS DRILLED (000)	RESERVES ADDED (BCF)	RESERVES ADDED/WELL (MMCF)	PRODUCTION (BCF)	RESERVES LOWER-48 (TCF)	R/P RATIO
1978	14.40	18,021	1,251.5	19,122	176.0	9.2
1979	15.17	14,704	969.3	19,663	168.7	8.6
1980	17.19	14,473	841.9	19,403	165.6	8.5
1981	19.97	17,220	862.3	19,181	168.7	8.8
1982	18.80	14,455	768.9	17,758	166.5	9.4
1983	14.34	11,448	798.3	16,033	165.9	10.3
1984	16.80	13,521	804.8	17,392	162.8	9.4
1985	15.51	11,128	717.5	16,382	159.6	9.7
1986E	7.94	5,955	750.0	15,940	151.1	9.5
1987E	8.00	6,000	750.0	16,140	141.6	8.8
Average 1978-1982	17.11	15,775	938.8			
Average 1983-1987	12.52	9,610	764.1			

Sources: Energy Information Administration, C/LEC calculations.

TABLE II
ANNUAL ADDITIONS TO GAS DEMAND FROM FUA EXEMPTIONS

YEAR OF EXEMP.	1981 ADDS. (BCF)	1982 ADDS. (BCF)	1983 ADDS. (BCF)	1984 ADDS. (BCF)	1985 ADDS. (BCF)	1986 ADDS. (BCF)	1987 ADDS. (BCF)	TOTAL ADDS. (BCF)
1982	3							3
1983	6	3						9
1984	10	6	10					26
1985	16	13	22	12				63
1986	22	20	36	38	45			161
1987	22	25	51	52	98	50		298
1988	22	25	66	67	148	100	60	488
1989	22	25	79	82	200	186	130	724
1990	22	25	79	97	250	310	220	1003
1991	22	25	79	97	310	400	320	1253
1992	22	25	79	97	372	490	420	1505
1993	22	25	79	97	372	580	530	1705
1994	22	25	79	97	372	580	640	1815

Source: Department of Energy, C/LEC estimates.

Senator FORD. Thank you, Mr. Rothschild.

Mr. Lawrence, you ticked off earlier all these statements about the long-term supply of gas and that sort of thing. Let me tick off some other ones to you from gas people. These are executives in the industry.

"Proven reserves are declining at a faster rate than ever before. The import of this decline has yet to be felt on deliverability, but when it does it will be difficult at best to restore adequate deliverability, let along stabilize an adequate level of reserves."

Another gas executive—if you want their names, I would be glad to give them to you.

Mr. LAWRENCE. I would like them.

Senator FORD. "I believe that there could be some peak-day shortages in the winter of 1987 and 1988. We have drawn down our inventory of lower 48 gas reserves to 160 tcf from 260 tcf since 1970. The surplus has been the result of inventory drawdown, not reserve additions."

Another energy executive, gas executive: "Barring a substantial increase in gas well completions, proven reserves will continue to drop by 8 to 10 tcf's a year."

And from a FERC Commissioner, "Anybody who is not worried about future gas supplies in this environment simply has his head in his hand."

A gas production executive: "Unless something changes pretty quick, I think we are heading to a severe gas shortage that we will not be able to overcome by drilling because it will take too long to catch up. Nearly everybody's deliverability has shrunk."

Another production executive: "The key to U.S. deliverability is the Gulf of Mexico, and right now that deliverability is hanging right up there. When it starts to fall, there is nothing that can be done onshore to catch deliverability on its way down. And I say to you that some U.S. consuming regions such as the Northeast receive 80 to 95 percent of their gas from pipelines that have the Gulf as their main source."

And I might quote one of the gentlemen at the table, Mr. Lay, a leading gas executive, recently observed, and I quote, "I think if we had seen sustained cold this winter, we probably would have seen some real tension throughout the system. We believe there is more tension on the market right now than many people think, and if we ever get that really sustained cold spell, it ought to become fairly interesting."

So these are just executives from within the industry, the producers, from FERC. They are saying we are sitting here with real problems. You tick off the others. Mr. Lay has probably now changed his statement a little bit from eight to nine years before the bubble bursts, but nevertheless that is a short term, Mr. Lawrence.

Do you want to refute any of those with yours?

Mr. LAWRENCE. Oh, absolutely, Senator. We have heard them for the past eight years, and for the past eight years they have been wrong.

I heard Senator Metzenbaum quote one independent producer that said it would take 5 million wells. Well, what he has done, he has taken a finding rate at a time when nobody is looking for any gas, and he has divided by the number of wells when the rig counts are the lowest in history, and I am surprised he came out as low as 5 million.

We always hear these stories about the supply poor-mouthing, and it hurts us. It hurts us in the marketplace. It hurts us in this issue right here. But the simple facts are, ever since you passed the NGPA in 1978, the oversupply in the unregulated intrastate market went national, it went interstate. We had an oversupply then of about 3 trillion cubic feet.

As Mr. Lay said, that was going to last about 18 months. We are now in the eighth year of it. We keep hearing all of this stuff. Now, if I may, we have heard that the reserve production ratio, the proved reserve inventory on the shelf, is something like ten years. Senator, it has been ten years since 1972.

We do not need those long inventories they used to have 20, 30 years ago. It is held at that rate. But you keep replenishing the proved reserves from the conventional potential supplies, of which there are some 800 trillion cubic feet. The Potential Gas Agency estimates today that we can make that available at $3 to $4 in current dollars, very economical numbers.

That in turn is being replenished.

Senator FORD. Is that $3 or $4 at the wellhead, or is that to the customer?

Mr. LAWRENCE. That is the wellhead.

Senator FORD. Sir?

Mr. LAWRENCE. That is at the wellhead. That sounds a little high compared to today's prices.

Senator FORD. It is about three times as high compared to what Senator Nickles said earlier.

Mr. LAWRENCE. But it is certainly low compared to some of the estimates we have heard producers say over the past years of needing $4, $5, $6, $7.

Senator FORD. Sure, back when we deregulated any new wells, sure, the prices went out the ceiling.

Mr. LAWRENCE. But we think those prices at the wellhead with the delivery system we have got will still compete in the marketplace. But my point is—and there is nothing clairvoyant about that $3 to $4, that is that one agency—producers argue about that. We argue about it. Nobody knows. But, Senator, if we pass this bill, for the first time in the history of this industry this industry will have the opportunity to develop this huge resource base without Federal statutory controls on either the supply or the demand side of its business, we really think it will respond well.

We honestly think the supply problem is overstated. This tremendous resource base needs to be made available.

Senator FORD. We are back to the same fight, then. Your gas people are right, and my gas people are wrong, and we quote the people at the table.

Mr. LAWRENCE. But our track record is better since 1978.

Mr. LAY. May I respond to that, Senator?

Senator FORD. Yes, sir. I am going to give you a good chance. Be careful what you say, because I have got other quotes, Mr. Lay.

[Laughter.]

Senator FORD. Oh, I understand that. Your record is good. But if I recall, you were one of the experts that helped us write the Act back in 1977-78.

Mr. LAWRENCE. Not this Fuel Use Act.

Senator Ford: We took a lot of input—well, you mentioned the Natural Gas Policy Act.

Mr. LAWRENCE. Yes, sir.

Senator FORD. Okay.

Mr. LAWRENCE. We were right there with you lobbying as hard as we knew how, and we compliment you on that.

Senator FORD. That is my claim to fame, Bud.

Mr. LAWRENCE. Mine, too.

[Laughter]

Senator FORD. Now let us get to one other thing.

Mr. LAWRENCE. Yes, sir.

Senator FORD. Let us get to one other thing. National energy policy must be designed, in my opinion—and I think you all agree—for good times and bad times. It must be equipped to deal both with oversupply situations and with shortages.

In the 1970s, curtailment plans were developed by interstate pipelines and approved by the Federal Power Commission at that time, which is now FERC, that apportioned pipeline system supply among its sales customers based on priority of the end use of the natural gas. This curtailment plan still stands. That has not been changed.

If you listened to Senator McClure this morning, there were about five different areas that he was concerned about, and this is just one, and how this plays against the others. Today more and more gas is transportation gas—transportation gas. You all understand what that is—not pipeline system gas. It is owned by the independent user who may not be subjected to curtailment.

All right, let us go one step further. In the first nine months of 1986, 9 of the largest 23 pipeline-carried gas was 40 percent or more transportation gas—40 percent or more. One simple case I think illustrates the dramatic changes taking place in the interstate natural gas transmission industry today.

In 1982 this one pipeline, the throughput of this major interstate pipeline—by the way, serving Kentucky—consisted of 95 percent sales of system supply, and 5 percent transportation. In 1986, the throughput on the same pipeline was 33 percent system supply and 67 percent transportation. Now how will current curtailment policy work in today's gas market if there is a shortage?

Mr. LAWRENCE. First, what you have described is a very tenuous transition zone we are all going through. You have decided the main reason against any mandatory statutory carriage is the fact that these negotiated carriage arrangements of transportation gas——

Senator FORD. Well, we have it on the books, though. That is on the books, and it is law, and they have to do it.

Mr. LAWRENCE. Right. But the reason for this movement so strongly in that direction is the oversupply of gas at the depressed spot market price is cheaper than system sales, so the industrial user can go by cheaper and get it carriage and the pipeline and the distributor to retain their industrial market will want to keep it.

But okay, what happens if we get in a shortage again? Well, shortages are tough. Curtailments are tough. That would be the nastiest thing the FERC would ever have had to step up to, had it gotten worse.

Senator FORD. Well, let me ask you this. Is transportation gas curtailed? Can you curtail it now under curtailment?

Mr. LAWRENCE. Well, to my knowledge it is not, except for section–

Mr. LAY. Some of that is interruptable.

Mr. LAWRENCE. Except for section 303(d) of NGPA, which says if existing curtailment policies——

Senator FORD. That is the emergency national——

Mr. LAWRENCE: Yes, that you can make them subject to that. Excuse me.

Senator FORD. That is all right. Go ahead. If anybody else wants to chime in, we are going to have a good time here.

Mr. LAY. My only point is, a lot of that transportation is interruptable. So when you get into a tight supply situation, that goes off first.

Senator FORD. How much of it? We are getting into—the point that really disturbs me is that we have no way to curtail it. We really have no way to curtail it.

Mr. LAY. For firm transportation that is correct, Senator, but probably on our systems we transport on a daily basis about between 2.5 and 3 billion cubic feet. I would guess that 80 percent of that is interruptable.

Senator FORD. Let me ask you a question, Mr. Lay. How much of the transportation gas is interruptable in your system?

Mr. LAY. Like I said, probably 75 or 80 percent.

Senator FORD. Is interruptable?

Mr. LAY. Is interruptable.

Senator FORD. How much of your pipeline is transportation gas?

Mr. LAY. Probably on the average, all of our systems, about 40 percent today. But indeed most of the growth in transportation volumes the last two or three years have been in response to the spot market that Bud talked about, and virtually all of that is interruptable.

Now there are a few long-term supply arrangements where it is firm transportation, but that is a very small percentage of the total.

Mr. LAWRENCE. Senator, if I could just add——

Senator FORD. In your opinion, then, Mr. Lay, will natural gas used by electric utilities be transportation gas? Or will it be pipeline system gas?

Mr. LAY. I think you will find both, and I think you will find——

Senator FORD. Why I understand that, but can you give me a one-handed estimate?

Mr. LAY. I think in many of the new plants, the new combined cycle or co-generation plants, that will be firm transportation gas.

Senator FORD. It will be transportation gas——

Mr. LAY. Transportation gas.

Senator FORD [continuing]. Not subject to curtailment.

Mr. **Lay**. But again the total number there will be significantly less than the kinds of numbers you are talking about there with 40 or 50 percent of the gas being transported the last several months.

Senator **Ford**. But I have made my point based on that, and you look to increase the use of natural gas in utilities which will be transportation gas and not subject to curtailment?

Mr. **Lay**. Well, Senator, if you want to put it in perspective, we have been talking about the potential market here of maybe as much as 2 trillion cubic feet for all combined cycle co-generation by the year 2000. If all of that was transportation and all of that was firm, then that is less than about 15 percent, about 13 percent of the total capacity of the pipeline system, the total sales in transportation of the pipeline systems today.

Senator **Ford**. Yes, but that is gas my residents will not get. That is gas my hospitals will not receive.

Mr. **Lay**. Now keeping in mind, again——

Senator **Ford**. That is the gas my peanut butter factory in Lexington will not get.

Mr. **Lay**. Well, but you take those high priority markets—I do not know about your peanut butter factory——

Senator **Ford**. Well, you have to have it for consistency, in case you are interested. I will be glad to take you through it sometime, if you would like to see how peanut butter is made.

Mr. **Lay**. And I favor consistent peanut butter.

[Laughter.]

Mr. **Lay**. But indeed all the residential-commercial usage, as we have indicated, is something less than 8 trillion cubic feet of the total market today of about 17 trillion cubic feet.

Now there is another 1 to 2 trillion, which probably includes the peanut butter factor, where in fact it is very high priority use and it is tough to have an alternative. But there is also 6 to 7 tcf where in fact alternate fuels can be used, and about half of that can immediately switch to oil almost overnight.

Senator **Ford**. Mr. Rothschild is so anxious he is about to bite that microphone.

Mr. **Rothschild**. Well, no. That is an aggregate number. I think using an aggregate number distorts reality. You have to look at this issue pipeline by pipeline, because if you look at it in the aggregate a lot of gas usage for electrical utilities and industrial use is down in the Southwest. A lot of the firm customers are up in the Northeast and the Midwest. So the pipelines that might face the severe curtailment, you do not have any kind of capability at FERC to shift gas from the Southwest that may be sold into those markets to pipelines that serve the Northwest.

So you cannot take the aggregate and say just because it is 8 trillion cubic feet for residential and commercial users, therefore they have to all get their gas. That is distorting reality. The reality is that you have to look at it on a pipeline by pipeline basis, and look at each pipeline and each pipeline system and whether they buy transportation gas, whether it is interruptable firm, and how much is firm sales, and then see how much of that gas is subject to the curtailment that currently exists.

Then you can have an analysis of what is likely to happen if there is a shortage on that particular system.

Mr. McGrath. Mr. Chairman, if I could add something there?

Senator Ford. Yes, sir, Mr. McGrath.

Mr. McGrath. Much of the gas that is being transported today under 436 or other FPC orders is for LDC's, local distribution companies. While a lot of that is interruptable service, they still retain the contract with the pipeline for system supply.

So, yes, you are being subject to interruption on that delivery, but much of that volume is going to local distribution companies for distribution to their customers.

Senator Ford. I find more and more—I find more and more, Mr. McGrath, transportation gas. I see more and more little companies together, and some gas executive slipping off and organizing a little group over here called XYZ, and they are coming to me and saying if you will buy from me we can deliver to you at a certain price, so therefore that is transportation gas, and it comes around your distribution system.

And they are not subject to FERC, and they are not subject to interruptables, and we have real problems. Now it is beginning to be a mishmash out there, in my opinion, and I watch it in my small community.

Mr. McGrath. Well, it is very true that a large part of the gas is going to industrial users, your peanut butter factory or whatever, but I wanted to point out to you that–

Senator Ford. I am sorry I mentioned peanut butter. It is beginning to come back to haunt me.

[Laughter.]

Senator Ford. But I want to tell you, man cannot live by bread alone; he must have his peanut butter. So let us go from there.

[Laughter.]

Mr. McGrath. What would we do without peanut butter and jelly sandwiches over the years.

Senator Ford. Yes.

Mr. McGrath. I just wanted to point out to you that the transportation volumes are both for industrial end users as well as for local distribution companies. So the interruptables that you are talking about could apply to both, and the LDCs have planned their supplies. As I say, many of them are still retaining their agreements with the pipeline for system supply.

Senator Ford. Mr. McGrath, since you are there, on page 3 of your testimony you say—and you gave it in your testimony also—that your support of S. 85 is based on understanding that such a bill will not become a vehicle for other natural gas provisions.

Would you continue to support this particular bill now if it did become a vehicle for major natural gas legislation?

Mr. McGrath. No.

Senator Ford. Good.

Mr. McGrath. Well, let me say this. We would certainly review it very carefully, but my position is that at this time we would not. We support a clean bill.

Senator Ford. You support a clean bill.

What about you, Mr. Lawrence?

Mr. Lawrence. Well, you know where we stand on mandatory carriage. We will oppose that to the last fiber of our being.

Senator Ford. You may have to stand on it again.

Mr. **Lawrence**. Okay, we will be there. And as to decontrolling old gas prices, that is something we always try to make some accommodation with.

Senator **Ford**. So you are not necessarily for a clean bill if other amendments are made to this piece of legislation, you do not support a clean bill if you can get the right kind of amendments on it?

Mr. **Lawrence**. I do support a clean bill.

Senator **Ford**. Oh, you do not want any amendments on it?

Mr. **Lawrence**. I do not want any amendments, because I know the history of this Committee, this Senate, this House, this Congress on doing that. It just is not going to happen. As Senator Johnston said, we want to do the doable one time.

Senator **Ford**. And the industry. I think you ought to add them in there a little bit, too. The history of the industry.

Mr. **Lawrence**. Well, we usually—that elite lobby you talked about, we spend most of our time lobbying each other.

Senator **Ford**. I did not talk about legal lobbies or anything like that. You all lobby each other, and then you cannot come up with a solid statement.

Let me say this. My advice to you is just to get ready for such a development, particularly in the House. They await this bill with open arms and unsheathed knives.

[Laughter.]

Mr. **Lawrence**. They passed H.R. 309 last year.

Senator **Ford**. And this process may well begin to develop on the Senate Floor. Because this bill appears to be that—let me just say this: If this Senator is still standing, it will never get a time agreement. I put that out. We talk about what it does to the industry. We talk about the unemployment you have, the extra supply you have, and that sort of thing, and we see Mr. Buckner sitting here. His message is the same as yours.

He is fighting for an energy source that is very important. I think that Mr. Rothschild's statement is basically correct. We ought to save the natural gas and oil for those higher uses, and we ought to use the coal as it relates to generating electricity. I am on that way and there is no way to keep my from it.

I supported the Pearson-Bentsen bill. I fought Senator Metzenbaum and voted against him every time, all day and all night Mary Ann, you know. We went around here for a good many days, and I supported the bill, and I am a consuming State. We produce coal, and I stayed there pretty hard.

I think now that somewhere you have made that extra step and you just want a little bit more. When you have 55 percent unemployment in a county—55 percent unemployment in certain counties—in your State, then you are going to defend it to the hilt, and I am going to dig the trench just as deep as I can.

Now if you are willing to take Mr. Farrand's amendment, which I will introduce and try to put on this bill before it gets out of here, you can see this boy back off. Up until 1980, it was the Ford-Lugar amendment. Do you all remember that? Then after 1980, it became the Lugar-Ford amendment. It switched over.

[Laughter.]

Senator **Ford**. So I have been trying to be amenable on this and will accept that amendment. Otherwise, if we cannot get that, I just put you on notice.

And on that note, I conclude.

Yes, Mr. Lay.

Mr. **Lay**. May I say, since you had one of my quotes earlier and I mentioned tension, and I do not know what other quotes you have got, but I have been very careful to never say we are going back into a shortage environment. I think part of the problem, which was referred to this morning——

Senator **Ford**. Well, you just said a minute ago that the bubble will burst in eight years.

Mr. **Lay**. Oh, no. What I said was, I said we have been looking at an eighteen month to two year gas bubble for eight or nine years, since 1979, and surely we will get back into equilibrium; but I think the real problem in a lot of this debate, in listening to Mr. Rothschild, too, is we try to refer back to the experience of th 1970s. Those are really totally irrelevant experiences today as we have deregulated most of the gas at the wellhead, and increasingly we are increasing the competition and the access and the pipeline system.

There now are market forces at work which will in fact allocate the supplies and prevent shortages. That does not mean that everybody is going to buy all the gas they want to at the price they want to buy it. But just like markets do tend to work in oil and coal and corn and a lot of other things, why——

Senator **Ford**. Well, Mr. Lay, tell me then why we have such a push up here for an import fee, then, if the market forces are working? The thought behind that, and I think it is public record, that in order to raise the price of domestic oil without going to any additional expense, you put the import fee on of $5. That raises domestic oil $5 more, and that will send them out to do more drilling.

Well, if I was an oil executive at 63 years of age, I think I would just take that $5 a barrel and run. I am not sure I would put it back into the ground. I am not sure I would have any exploration. But what we see is, on the one hand—and all energy is interconnected in some way or another—but when you want to put on an import fee, the same people here today on both sides of this podium want an import fee. Yet, they want to eliminate the Fuel Use Act.

Now somewhere along the way you have to be honest with us.

Mr. **Lay**. I think in fact the industry has a pretty good record of reinvesting its cash flow in the oil and gas drilling business, Senator. I am not here to pitch the import fee. I do think in fact what is happening particularly to our oil service business is in fact going to be very serious for this country, long term, from the standpoint of making sure we have got adequate domestic resources. But indeed, whether an import fee is the right approach, or whether some other approach to make sure we get some of those drilling rigs back to work in trying to find domestic oil and gas, I think we probably do need to do something.

But that is not the purpose here today. I think the Fuel Use Act will repeal itself by creating some new markets for natural gas and will in fact create an additional incentive for people to go out and start drilling for gas.

Senator **Ford**. But in creating that new incentive, you are taking away from somebody else. You are taking it out of the hide of somebody else.

Mr. **Lay**. There are no data on this, Senator, but I indeed would suggest that to some extent if gas-fired facilities are not available in some parts of the country, instead of more coal, more domestic coal, you are going to see more imported oil being burned in existing oil-fired facilities and some imported coal being burned.

So it is not exactly a one-for-one tradeoff.

Senator **Ford**. You know, I understand I am supposed to quit because it is already 1:00 o'clock and I want my peanut butter sandwich, but this country makes low-interest loans and grants to develop coal mines to put in competition with our people. We are at over 40 percent, now, in import of oil and we sit here and say everything is lovely.

We have watched Canada come down below the border and just eat our lunch because they are being subsidized. There is no question about it.

So what we find is that we are doing it to ourselves, and we have the highest import deficit in the history of this country. Every year it gets larger. As long as we keep that up, and a major portion of that is oil, and we had testimony on the world oil supply in here yesterday, that it probably would ease upward by the end of this decade to 50 percent.

We have not got a chance. The new ingredient is Canada. They are coming across the border. Why is it that they can take it away from us and we sit here screaming at each other and arguing at each other and we lose our own markets within our own lower 48? Something ought to be done about that.

We are sitting here arguing about the Fuel Use Act, and we are losing our markets every day. Every day we are losing our markets. So I am going to quit.

Do you have anything else you want to say, any of you? Why just crank up, and then I am going to go to the next panel.

All right, Mr. Rothschild, I will give you a chance.

Mr. **Rothschild**. One last quick thing. That is, just to refute Mr. Lawrence. He talks about the finding rates for gas. They have been continually going down, at least from 1978, when the finding rate per well was about 1.3 million cubic feet per well, or billion cubic feet per well, going down to about 717 in 1985. It has been going down over the period when part of that period prices were going up, when the finding rates should have been going up, but that was not happening.

So he ought to present some evidence to show how this wonderful potential that exists is going to come onstream, how long it is going to take, at what price, to support the notion that we ought to pass legislation that will increase demand for natural gas.

Mr. **Lawrence**. A quick answer to that, Senator?

Senator **Ford**. I asked for it. As quick as you can, Bud.

Mr. **Lawrence**. That entire period he is talking about is a period of oversupply, regardless of what the price was. Reasonable minds can argue about whether the incentive price is $2, $3, $4, $5, $6, but when it is zero because there is an oversupply and gas is shut in, that is a disincentive, and that is affecting the finding rate.

We have never had gas-prone exploration in this country for more than ten minutes, but one of these days we are going to have to have it, because everybody, all the experts are acknowledging that the natural gas, the methane resource base, is much bigger in the lower 48 than oil.

Thank you.

Senator FORD. And everybody agrees on our side there is going to be a shortage.

[Laughter.]

Senator FORD. Thank you, gentlemen. I appreciate it very much.

The next three panelists are James G. Harlow; Larry Hobart; and Kenneth P. Woodcock.

Mr. Woodcock, if you would like to start, then we will have Mr. Harlow and Mr. Hobart.

Mr. WOODCOCK. Thank you very much, Senator.

Senator FORD. Wait just a minute and let me get my bell.

[Laughter.]

Mr. WOODCOCK. I was trying to get a few words in before the bell started.

Senator FORD. Like the fellow said, "I'd like to say a few words before my time starts."

[Laughter.]

STATEMENT OF KENNETH R. WOODCOCK, VICE PRESIDENT, APPLIED ENERGY SERVICES, INC.

Mr. WOODCOCK. Applied Energy Services is an independent supplier of steam and electricity, part of the rapidly growing independent power production industry. AES was founded by Roger Sant in 1981, who earlier developed the concept of least-cost energy strategies as a policy objective of the United States.

AES presently operates 165 megawatts of electric generating capacity in Houston and Pennsylvania. We also have 380 megawatts of capacity under construction in Pennsylvania, California, and Connecticut, and expect to begin construction of a 300 megawatt plant in Oklahoma in 1987.

With the exception of our 100 megawatt gas-fired plant in California, all of the above-noted capacity is solid fuel fired—that is, petroleum coke or coal fired. Furthermore, all of the additional projects that AES has in the early stage of development will be fired by coal or lignite.

As a competitive producer of power, we must find a long-term, least-cost power supply option in order to gain our share of the market. Accordingly, we evaluate in each case the range of fuels and technologies in order to determine the strategy that will allow AES to be a low-cost supplier of electricity.

Our analyses show in essentially all the cases we have examined that a coal-fired facility will provide the least-cost power supply option for facilities that begin commercial operation in the early 1990s and are expected to have a commercial life of approximately 30 years.

My goal today is to share with you our experience regarding the long-term competitiveness of coal versus natural gas fired capacity, and the reasons AES has selected coal as our preferred fuel. That experience includes our mature projects, projects where we have electric contracts under construction, as well as projects at the earlier stage.

We are presently negotiating with utilities located in the Northeast, Southeast, Gulf Coast, and far West. I am not here today to discuss the merits of any specific modifications to the Power Plant and Industrial Fuel Use Act. Rather, we have been asked to state our views on the competitiveness of coal-fired electric generating plants.

In the cases where we have mature projects, we have found the addition of coal-fired capacity will provide our utility customers with long-term savings, assured price stability, and a reliable supply of power. Long-term price stability is achieved by power supply contracts to tie the energy component of our rate to indicators of general inflation such as the GNP implicit price deflator, or to the actual price of coal delivered to the generating stations owned by our utility customer.

We have been successful thus far in purchasing coal under long-term contracts where the price is tied to an indicator of general inflation. We find that numerous coal suppliers are willing to sell under such terms. This market behavior by competing coal suppliers to us represents the competitive nature of the coal industry and the ability of that industry to be a low-cost supplier of Btus over the long term.

Our use of coal in circulating fluidized bed boilers provides two other advantages. The boilers allow us to use a wide range of coals and provide us therefore with additional market power as a coal buyer. Secondly, the boilers allow us to site and permit plants in a variety of locations because of the exceedingly low air pollution emissions generated by the boilers.

We have tried repeatedly to obtain long-term gas supply contracts along the same lines. That is, long-term base-priced contracts with generic escalators, the type of contracts the coal suppliers have been more than willing to accept. However, our unsuccessful discussions with gas suppliers lead us to conclude that such contracts are not available.

Available long-term gas supply arrangements therefore would expose our utility customers, and therefore their ratepayers, to substantial future price risks. The expected spread between future price of natural gas and coal is obviously the determining factor in our judgment that the coal-fired plant is the low-cost option.

Present worth analysis leads us to this conclusion even when the capital cost of a coal-fired facility is two to three times the capital cost of a natural gas fired system.

In cases where AES is discussing new electric supply agreements with potential utility customers, we inevitably become involved in comparative analysis of alternative technologies and fuels that provide reliable capacity and energy over the long term. Coal-fired capacity and rates are always compared against combustion turbine, combined cycle, and the three-stage combustion turbine combined cycle coal gasification option.

If short-term analyses are conducted, the coal-fired option is assuredly the higher cost baseload option. A 30-year analysis, however, using reasonable coal and natural gas price projections generally show the present worth of the coal-fired option to be equal or less than the gas-fired option. We have reached this conclusion for plants that involve rail and barge deliveries of coal, as well as mine-mouth plants involving trucked coal.

Moreover, we clearly find the preferred choice to be coal-fired capacity when the potential for gas supply disruptions or price volatility due to the effect of OPEC pricing policies are considered.

I guess in general we further just state that one of the reasons we see this differently often from our utility customers is the short-term nature and the short-term view of regulatory commissions and a lease commitment strategy on their part to avoid large investments, and have short development time projects.

I appreciate the opportunity to be here today.

[The prepared statement of Mr. Woodcock follows:]

STATEMENT OF
KENNETH R. WOODCOCK
VICE PRESIDENT, APPLIED ENERGY SERVICES, INC.
BEFORE THE UNITED STATES
SENATE SUBCOMMITTEE ON ENERGY REGULATION AND CONSERVATION

MARCH 12, 1987

I appreciate having the opportunity to present the views of Applied Energy Services, Inc. (AES) to this Subcommittee on the use of natural gas as compared to coal in new electric generating facilities.

AES is an independent supplier of steam and electricity--part of the rapidly growing independent power production industry. AES was founded in 1981 by Roger Sant, who is presently the Chairman, President and Chief Executive Officer of AES. Mr. Sant formerly served as the Assistant Administrator for Conservation and Environment in the Federal Energy Administration during the years immediately following the Arab oil embargo. He later developed the concept of the "Least Cost Energy Strategy" as a policy objective of the United States.

AES presently operates 165 MW of electric generating capacity in Houston, Texas, and Monaca, Pennsylvania. We also have 380 MW of capacity under construction in Pennsylvania, California, and Connecticut, and expect to begin the construction of a 300 MW plant in Oklahoma in mid-1987.

With the exception of our 100 MW gas-fired plant under construction in California, all of the above-noted capacity is solid fuel fired--that is, fired with coal or petroleum coke. Furthermore, all of the additional projects that AES has in the early stage of project development are fired by coal or lignite.

As we negotiate power supply contracts with our regulated utility customers throughout the country, we routinely compete against: (1) additional capacity our utility customers may plan to install; (2) power purchase contracts that may be signed with utilities that have excess generating capacity; and (3) other independent power producers. As a competitive producer of power, we must find the long term, least cost power supply option in order to gain our share of the market. Accordingly, we evaluate in each case a range of fuels and technologies in order to determine the strategy that will allow AES to be the low cost supplier of electricity. Our analyses show, in essentially all the cases we have examined, that a coal-fired facility will provide the least cost power supply option for facilities that begin commercial operation in the early 1990's and are expected to have a commercial life of approximately 30 years.

My goal today is to share with you our experience regarding the long term competitiveness of coal versus natural gas-fired capacity and the reasons AES has selected coal as our preferred fuel. That experience includes our mature projects -- power projects for which we have signed electric supply contracts and completed development activites (which include coal procurement and project financing). Our other experience is with our early stage projects -- these involve ongoing negotiations with potential new electric utility customers. We are presently in negotiations with utilities located in the Northeast, Southeast, Gulf Coast, and Far West.

I am not here today to discuss the merits of any specific modifications to the Powerplant and Industrial Fuel Use Act. Rather we have been asked to state our views on the competitiveness of coal-fired electric generating plants.

In cases where we have mature projects, we have found that the addition of our coal-fired capacity will provide our utility customers with long-term savings, assured price stability, and a reliable supply of power. Long-term price stability is achieved by power supply contracts that tie the energy component of our rate to indicators of general inflation, such as the GNP Implicit Price Deflator, or to the actual price of coal delivered to the generating stations owned by our utility customer.

We have been successful, thus far, in purchasing coal under long-term contracts (i.e., a 15 year contract that starts in late 1989) where the price is tied to an indicator of general inflation. We find that numerous coal suppliers are willing to sell under such terms. This market behavior by competing coal suppliers to us represents the competitive nature of the coal industry and the ability of that industry to be a low-cost supplier of Btu's over the long term.

Our use of coal in circulating fluidized bed boilers provides two other advantages. The boilers allow us to use a wide range of coals and, therefore, provide us with additional market power as a coal buyer. Secondly, the boilers allow us to site and permit plants in a variety of locations because of the exceedingly low air pollution emissions generated by the boilers.

We have tried repeatedly to obtain long-term gas supply contracts along the same lines -- that is, long term based priced contracts with generic escalators -- the type of contracts that coal suppliers have been more than willing to accept. However, our unsuccessful discussions with gas suppliers lead us to conclude that such contracts are unavailable. Available long term gas supply arrangements would, therefore, have to expose our utility customers and, accordingly, their ratepayers to substantial future price risks.

The expected spread between the future price of natural gas and coal is obviously the determining factor in our judgement that a coal-fired plant is the low-cost option. Present worth analyses lead us to this conclusion even when the capital cost of a coal-fired facility is two to three times the capital cost of a natural gas fired system.

In cases where AES is discussing new electric supply agreements with potential utility customers, we inevitably become involved in comparative analyses of alternative technologies and fuels that provide reliable capacity and energy over the long term. Coal-fired capacity and rates are always compared against a combustion turbine, a combined cycle or the three stage combustion turbine/combined cycle/coal gasification option.

If short term (e.g., 6-10 years) analyses are conducted, the coal-fired option is assuredly the higher cost base load[1] option. A thirty year analysis, however, using reasonable coal and natural gas price projections generally shows the present worth of the coal-fired option to be equal or less than the gas-fired option. We have reached this conclusion for plants that involve rail and barge deliveries of coal as well as minemouth plants involving trucked coal. Moreover, we clearly find the preferred choice to be coal-fired capacity when the potential for gas supply disruptions or price volatility due to the effect of OPEC pricing policies are considered.

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[1] For a peaking facility, gas is clearly the least-cost option.

Why do we often arrive at a different conclusion from the self-owned power supply option selected by our regulated utility customer? I believe there are a number of reasons why our preference for coal differs from the gas-fired options often found in our customer's capacity expansion plans. Most important is the utility regulatory climate. Many regulatory commissions seem to have adopted a "least commitment" strategy that emphasizes short development lead times, and low capital cost facilities -- all with the interest of limiting ratepayer exposure to high capital cost plants. This strategy clearly favors natural gas fired facilities. This is a strategy with a very short term focus. We believe that today's depressed natural gas prices and the "least commitment" capacity selection strategy will lead to mistakes that will be costly in the long term. Furthermore, our experience suggests that lead times for coal plants are not appreciably longer than for gas plants.

We conclude from our observations that our country would best be served by a balanced strategy regarding the use of coal and natural gas in new generating capacity. We encourage this Subcommittee to reject any policy that essentially rules out coal as a new power supply option. We believe that both the long term price and availability of natural gas are too uncertain to justify major new investments in gas-fired generating capacity.

In closing, when we compare the coal option to the natural gas option, we observe the following:

- current gas prices are not long-term equilibrium prices because of the over-supply situation;
- the current gas bubble is likely to dry up between 1990 and 1995 because of the lack of sufficient exploration and drilling--or approximately when new plants presently being evaluated will begin a long term life;
- the gas bubble will likely end with a spike in prices because of enhanced gas demand, and lagging production;
- gas prices in the future will be volatile because of the relationship between gas prices and OPEC decisions;
- coal prices will remain cost-based because of abundant domestic supplies as well as continuing improvements in coal production technology;
- therefore, we expect the gas versus coal price spread

to grow between 1990 and 2020; DOE and industry forecasts show gas prices growing at 3-6 percent per year faster than inflation after 1990, while coal prices might rise with inflation (or slightly higher, depending on transportation costs);

- contractual arrangements with gas suppliers do not necessarily ensure stable gas prices over a 30 year period; and

- there are risks of contract abrogation with gas supply agreements that allege to provide stable long-term prices.

We appreciate the opportunity to present our views at these important hearings. Thank you.

Senator FORD. Thank you very much, Mr. Woodcock.

Mr. Harlow.

STATEMENT OF JAMES G. HARLOW, JR., CHAIRMAN OF THE BOARD AND PRESIDENT, OKLAHOMA GAS AND ELECTRIC CO., ON BEHALF OF THE EDISON ELECTRIC INSTITUTE

Mr. HARLOW. Thank you, Mr. Chairman.

I am Jim Harlow, Chairman and President of Oklahoma Gas and Electric Company. We have 5800 megawatts of power in central Oklahoma and western Arkansas. We are 51 percent natural gas and 49 percent coal. I bring that up because prior to 1977 we were 100 percent natural gas. In the late 1960s we went ahead and converted, or began construction of five coal units which made us 50 percent gas and 50 percent coal long before the Fuel Use Act was passed. So we made this decision based on our need for fuel diversity.

Also, I represent Edison Electric Institute, which represents some 73 percent of all the electric utility customers.

I do express appreciation for myself and the industry for reviewing the Fuel Use Act, and we hope that it will allow us to have some of the better options in terms of peaking, intermediate, and baseload decisions which we can make if we are allowed to use gas. This of course we believe to be the most efficient option for us at the current time.

As you know, we all know, during the early years, the 1960s and 1970s, we did have a shortage of natural gas during this period because of the depression of the prices at the wellhead, and of course after that point, and up to this time there has been generally a deregulation of natural gas which has, as discussed by your other witnesses this morning, loosened the market up.

There is a tremendous amount of gas available. We believe the market is continuing to be a positive thing in terms of availability.

As the world stands today with the Fuel Use Act, as an electric utility we have one choice, coal, that we can build in terms of plant. We feel that we need the gas option. Incidentally, we do have a 20-year gas supply, and we do sign 20-year contracts periodically. We are in the oil patch, and that is an advantage.

Senator FORD. Let us let the bell ring.

In signing that 20-year contract for natural gas, what kind of escalator clause do you have? You have just a flat 20-year price, but what is the escalator?

Mr. HARLOW. Well, in many cases it is an area-wide pricing contract with the supplier so that the highest price in the area is what we are going to pay. They generally do not have fixed escalators on them right now.

Senator FORD. Okay.

Mr. HARLOW. Shall I go ahead?

Senator FORD. Yes, sir.

Mr. HARLOW. We need this gas option because of shorter lead times. We feel that the ability to put units in on a shorter period like maybe a couple of years, as opposed to six or eight years for the coal option, is very desirable in this kind of an environment where we do not know how fast we are growing.

We believe that the combined cycle units which have been discussed already can come on in smaller increments. We can bring on the turbine first, and then the waste gas boiler, and then eventually the gassifier if that is desirable, and this should be a decision for us as a utility as opposed to being forced upon us by some kind of a law.

We feel we should have the option to decide that. These plants, as I say, can be built in building blocks. They can come on the with the turbine, and then a waste gas generator, and followed finally by the gassifier if we should choose to decide that. At least that is the way we would like to see that.

It also avoids bringing rate increases on in big chunks, and would make us less likely to cause rate shock. So we feel that is positive.

Finally, if we modify the Fuel Use Act to do this, we can eliminate the necessity for these waivers and the exemption process, which we feel is a difficult problem and adds uncertainty to the construction, and probably is we feel very expensive and not really productive. It would be of benefit of course to the gas and oil industry in our State and in our region.

And another point that probably we should bring out is the fact that about 57 percent of the electricity in the United States is generated by coal now. We do not see that any kind of moves in the Fuel Use Act are going to change that substantially. For instance, in our case we will continue to generate half of our generation by coal, as will most everybody else. So we do not see a decline there so much, but we see the future increases in need would be shared between coal and natural gas.

Finally, we again think that this should be a decision by the utility, the decisionmaker who is going to have to operate the plant, as to whether it should be coal-capable.

Again, we appreciate very much your considering the modification of this Fuel Use Act. I do want to mention one thing. In the introduction of my letter earlier, we were talking more last year in terms of the large and small boiler concept with the other kind of technology. This year, as you can see, most of our technological stuff is with the combined cycle.

[The prepared statement of Mr. Harlow follows:]

TESTIMONY

JAMES G. HARLOW, JR.
CHAIRMAN OF THE BOARD AND PRESIDENT
OKLAHOMA GAS AND ELECTRIC COMPANY

ON BEHALF OF THE

EDISON ELECTRIC INSTITUTE

POWERPLANT AND INDUSTRIAL FUEL USE ACT OF 1978

AND

S. 85, "NATURAL GAS UTILIZATION ACT OF 1987"

Thursday, March 12, 1987

SUBCOMMITTEE ON ENERGY REGULATION AND CONSERVATION

COMMITTEE ON ENERGY AND NATURAL RESOURCES

UNITED STATES SENATE

I am James G. Harlow, Jr., Chairman of the Board and President of Oklahoma Gas and Electric Company.

Oklahoma Gas and Electric Company, the largest electric utility in Oklahoma, owns and operates an interconnected electric production, transmission and distribution system. The system includes eight generating stations with a total capability of 5,772,300 kilowatts. The fuel mix of our powerplant boilers is about 51 percent natural gas and about 49 percent coal. The company, an investor-owned utility, furnishes retail electric service in 269 communities in Oklahoma and western Arkansas. The company also provides wholesale electric service to 9 communities and two rural electric cooperatives. At the end of December 1986, more than 639,000 customers received electricity from Oklahoma Gas and Electric Company. Approximately 1,600,000 people reside within Oklahoma Gas and Electric Company's 30,000 square mile service area which includes Oklahoma City, the largest city in Oklahoma and the location of the Company's corporate offices and Fort Smith, the second largest city in Arkansas.

As a member of the Board of Directors of the Edison Electric Institute (EEI), I am representing that group today. EEI is the association of electric companies. Its members serve 96 percent of all customers served by the investor-owned segment of the industry. They generate approximately 75 percent of all electricity in the country and service 73 percent of all ultimate customers in the nation.

I want to express both my and our industry's appreciation to this Committee for giving consideration to S. 85, to amend the Powerplant and Industrial Fuel Use Act of 1978 (FUA). Our comments today will be directed towards those portions of S. 85 which amend the end use constraints of FUA. Revision of FUA through passage of S. 85 will permit electric utilities to meet future capacity needs -- whether for peaking, intermediate or baseload units -- in the most efficient, cost-effective manner, and will enable utilities to compete effectively with other providers of electric power. We applaud the Subcommittee for considering S. 85 so promptly in the 100th Congress, and urge its speedy adoption.

As you well know, the price of natural gas was artificially depressed in the late 1960's and early 1970's by federal wellhead price regulation. The shortage of natural gas at that time created the impetus for the adoption of FUA and The Natural Gas Policy Act of 1978 (NGPA). FUA, through its various prohibitions, has now helped to create a gas oversupply situation with large quantities of natural gas available throughout the country at the present time and for the foreseeable future. As a result of the restructuring of natural gas pricing in the NGPA, the natural gas industry and its markets have demonstrated that substantial volumes of gas can be made available. Furthermore, initiatives of the Federal Energy Regulatory Commission (FERC), such as its Order Number 451, have nearly completed the deregulation of wellhead natural gas prices. For all practical purposes, the wellhead pricing of natural gas now operates in a free market, a condition the coal industry has repeatedly insisted upon before further amendments to FUA should be adopted. We believe the current fuel markets are consistent with the proposed amendments to FUA.

TECHNOLOGY TO MEET UTILITY NEEDS

The repeal of the limitations on the construction of new gas-fired powerplants would add significantly more, and much needed, flexibility to electric utilities which may have to add generating capacity in the future. In our industry, the only viable choice for new construction today is coal. The option to use natural gas will make it possible for many companies, including mine, to install generation which we calculate to be less expensive to construct than coal-fired capacity. The short lead times required for construction of gas-fired generation are particularly important to our industry, given the current state of uncertainty in load growth projections.

While amendments to the Fuel Use Act would make it easier for utilities to construct new natural gas-fired powerplants, such amendments would not result in electric utilities dramatically increasing their percentage of natural gas utilization for power generation, nor would it mean that electric utilities will decrease their present use of coal in existing coal-fired generating plants.

Gas-fired capacity using today's combined cycle technology can be added more rapidly and in smaller increments than coal-fired capacity, which results in significant savings to consumers during construction. This characteristic of the combined cycle technology gives utilities the option to adopt a "phased" approach to the addition of new capacity.

Phased construction of a natural gas-fired powerplant typically would occur as follows: a combustion turbine (similar to a jet engine in concept) would be added to a utility's system when and as needed, and is used for peaking purposes. The combustion turbine is the building block on which flexible fossil fuel-fired technologies are based. Figure 1 is a block diagram of a combustion turbine, often referred to as a "simple cycle" generation facility. Its advantage is that it can be quickly and inexpensively installed, in small sizes, to meet our incremental load growth. This technology, which has improved greatly over the last few years, can be readily used to meet peak and intermediate demand because, unlike coal and nuclear facilities, it can easily be brought on and off line.

To the combustion turbine, as need develops, a steam generator could be added to recover waste heat from the combustion turbine described above. Because a combined cycle powerplant generates electricity from both the combustion turbine and from waste heat (through the steam generator), it has two power production cycles -- thus the term "combined cycle." Utilizing the same fuel as the combustion turbine, this technology is very efficient as a result of the use of the waste heat to generate electricity. The waste heat recovery cycle increases efficiencies by approximately 35%. With the addition of a waste heat recovery system, a combined cycle unit can efficiently be used as a baseload facility as demand for baseload capacity dictates.

A waste heat recovery steam generator need not be built at the same time a combustion turbine plant is constructed. Figure 2 illustrates that the waste heat recovery system is a separate part of the combined cycle plant. By waiting until the electric utility needs additional generating capacity to add the waste heat recovery portion of the plant, the consumer benefits by from the spreading of significant capital expenditures are spread over a number of years. Therefore, the phased approach to combined cycle powerplant construction will minimize the chances of consumer "rate shock."

COAL CAPABILITY OF COMBINED CYCLES

Finally, if and as necessary, a coal-derived gasification system could be eventually added to the combined cycle power plant, utilizing coal to produce the gas required for the plant. In this manner, a combined cycle gas-fired powerplant is truly "coal capable." Rather than utilizing coal in the manner of a traditional pulverized coal powerplant with a scrubber, a combined cycle powerplant could utilize coal in the form of a coal-derived synthetic gas. Figure 3 illustrates the addition of a gasification plant prior to the combined cycle plant. We believe that this method of building gas-fired capacity is both highly efficient and extremely flexible. Both of these characteristics are critical to the needs of electric utilities and their customers.

REGULATORY UNCERTAINTY

The elimination of the current FUA restrictions on utility powerplants will free utilities wishing to construct new gas- or oil-fired capacity from the uncertain and time consuming exemption process currently conducted by the Department of Energy (DOE). I have been informed that this process can take up to two years, and cost a utility from $100,000 to $200,000. Elimination of this unnecessary regulatory hurdle through the adoption of S. 85 will permit new capacity to be installed in a much more timely manner. It should be pointed out that state regulators will still have the ability to determine whether a specific powerplant is needed given the requirements of each utility.

ELECTRIC UTILITY COMMITMENT TO COAL

The constraints imposed by the FUA affect the electric utility industry and its customers more directly than they influence any other sector of the energy industry. Our customers, the residential, commercial and industrial consumers of electricity, have the greatest stake in the outcome of any proposed changes to this legislation.

We are concerned about the most efficient possible use of fuel and about the cost of power to our customers. Our interests are in providing our customers with long-term, reliable electricity at a reasonable cost. We believe that S. 85 is needed to provide electric utilities with the greatest fuel and technology flexibility to choose the approach to generating capacity additions that is most economically viable and competitive as we evaluate our customer's needs for future electric growth. S. 85 will allow selections of fuel and technology to be based on economics and demand projections, not on the basis of a federal mandate that has outlived its usefulness.

Adoption of S. 85 will not immediately or radically shift the generating mix of fossil fuels in our industry. In 1985, coal provided 56.8% of the fuel for electricity generation in the United States, an increase from 44.2% in 1978. According to the North American Electric Reliability Council (NERC), 34,161 MW of new coal-fired generating stations are in the construction schedule over the next 10 years. We do not envision that FUA amendments will change the construction status of these plants.

While amendments to FUA would make it easier for selected utilities to site a new natural gas-consuming power plant, these amendments will not mean that the electric utilities will dramatically increase their percentage of natural gas use for power generation. Indeed, natural gas use has decreased in the electric utility industry over the past decade. In 1985, approximately 11.8% of electricity production was generated through the use of natural gas. This figure has decreased from a high of 24.3% in 1970. My company now generates approximately 49% of its electricity from coal; prior to

1977 we were exclusively dependent upon natural gas.

An additional benefit to the legislation is regional in nature; however, I must mention that gas producing states such as mine are very depressed at this time due to the current low price of oil and the oversupply of natural gas. It is my opinion that the amendments to the Fuel Use Act will be a tremendous benefit in helping to restore the economic health of the strategically critical energy producing states, with no adverse impact on the other states that I can envision.

THE UNCERTAINTY OF ELECTRICITY DEMAND

Given the uncertainty of electricity demand, the utility industry must look to generating technologies which can rapidly respond to changing load forecasts. It is very difficult for a company to contract for a major new powerplant that may take 10 or more years to construct. The experiences of the last decade have made us all too familiar with the problems associated with long lead-time construction projects involving large boilers.

The lower installed cost of gas-fired plants makes today's gas-fired generating plant an economical alternative. To illustrate the cost savings to consumers, I have performed several calculations. In making the calculations, I have made several assumptions based upon data from Oklahoma Gas and Electric Company; however, I believe the assumptions to be representative of the industry as a whole. Thus, I have assumed that, for purposes of the calculation, the cost relationship between gas and coal will remain at the same approximate ratio through 1993, which is approximately $2 per BTU for gas versus $1 per BTU for coal, and thereafter will rise to a ratio of 2.5 to 1 by 1996. Also, I have assumed that the capital cost (excluding carrying costs) of a coal-fired unit will be 1.88 times the cost of a comparable natural gas-fired plant. Using these assumptions, I have established the following cost relationships:

1. The dollar savings to customers over a 10 year period from 1987 through 1996 for a multiple-unit 500-megawatt combined cycle gas-fired plant, versus a comparably sized coal-fired unit, would be $210,000,000 at a 65% capacity factor, or $275,000,000 at a 50% capacity factor. (The capacity factor is the percent of time that the plant is operating at maximum capacity.)
2. Savings to customers are estimated to be between $21,000,000 and $27,000,000 annually for each multiple unit 500 megawatt gas fired installation, as compared to a 500 megawatt coal fired unit with scrubbers added.
3. Based on current construction costs, gas prices in the future could rise to approximately 2.54 times the delivered price of coal and still permit the gas-fired units to remain economical.
4. Each multiple-unit 500 megawatt gas-fired electric generating installation will burn approximately 20 to 25 billion cubic feet of gas annually. In 1987, this would represent between $57,000,000 and $72,000,000 in gas purchases, which would assist the rebuilding of the energy industry in the gas-producing states such as my own Oklahoma.

We are witnessing increased competition with cogenerators. The rapid growth of cogeneration has a twist: cogenerators are guaranteed a market for their power, usually at a very high price, yet are not constrained by FUA as to their choice of fuels.

FUA now hinders utilities' efforts to compete effectively, by depriving them of the freedom to select the fuel, generating technology, and plant size that best meets the needs of the market. In fact, the Fuel Use Act places utilities seeking to add new generating capacity at a significant competitive disadvantage vis a vis cogenerators by initially mandating a large-scale, long lead-time, "most cost" approach to new capacity additions.

FUEL MARKET IMPLICATIONS OF FUA CHANGES

Utilization of natural gas does not expose utilities to the same risks of exposure to OPEC pressure as the use of oil did in the 1970's. If small increments of new capacity are added using natural gas, that capacity will be using a fuel that is abundantly available from U.S. sources. It should also be noted that NERC projects the retirement of 6,000 MW of gas-fired and 4,205 MW of oil-fired capacity before 1995 which will further reduce exposures to OPEC pressures. And, as previously noted, a utility can add a coal gasification unit to a combined cycle powerplant, should gas supplies or prices dictate this course.

Fuel market economics vary throughout the country and from utility to utility. Adoption of S. 85 would allow electric utilities to optimize their choices of fuel and technology, based upon the approach that represents the best choice locally, with the approval of the relevant state public utility commission.

SUMMARY

The Edison Electric Institute believes S. 85 is needed to free utility managers to employ a flexible approach to technology and fuel selection in the interest of minimizing costs to our customers. We do not believe that arbitrary federal standards should contrive to force us to choose generating technologies that are only cost-effective in large sizes and cannot be added incrementally. In an era in which electric utility demand is uncertain, we must have available technologies which can be developed quickly and reduce consumer costs. S. 85 will enable utilities to take advantage of these technologies, while avoiding the regulatory risk currently associated with efforts to secure FUA exemptions.

The demonstration of coal gasification combined cycle technology shows that there exists a ready means for utilities to shift fuels as necessary. We are confident that a utility's decision to take advantage of the flexibility offered by the combined cycle technology will not lessen the industry's commitment to coal, nor irrevocably commit it to a fuel that may someday be in short supply.

The time has come to remove the outmoded constraints of FUA and to permit utilities to respond to the needs of the marketplace for the benefit of the nation's energy consumers. We urge your support of S. 85, and look forward to working with the Committee.

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Figure 1 – Simple Cycle Combustion Turbine

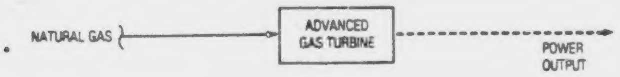

NATURAL GAS
ADVANCED GAS TURBINE
POWER OUTPUT

Figure 2 – Combined Cycle Powerplant

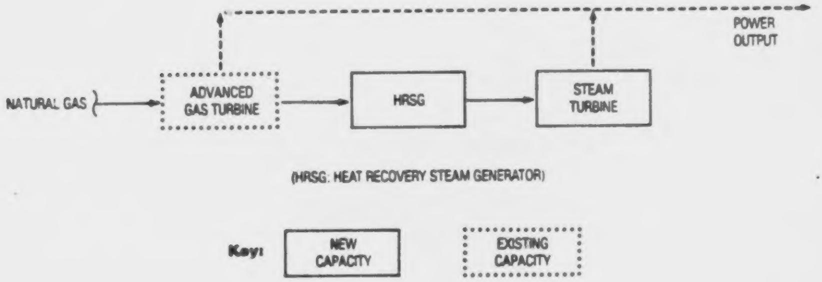
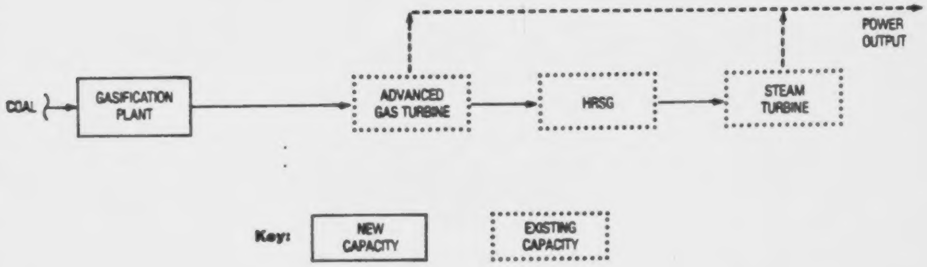

POWER OUTPUT
NATURAL GAS
ADVANCED GAS TURBINE
HRSG
STEAM TURBINE
(HRSG: HEAT RECOVERY STEAM GENERATOR)
Key:
NEW CAPACITY
EXISTING CAPACITY

Figure 3 – Combined Cycle Powerplant with Coal Gasifier providing fuel


POWER OUTPUT
COAL
GASIFICATION PLANT
ADVANCED GAS TURBINE
HRSG
STEAM TURBINE
Key:
NEW CAPACITY
EXISTING CAPACITY

Senator FORD. Fine. Thank you very much, Mr. Harlow.

Mr. Hobart

STATEMENT OF LARRY HOBART, EXECUTIVE DIRECTOR, AMERICAN PUBLIC POWER ASSOCIATION

Mr. HOBART. Thank you, Senator.

The American Public Power Association as you know, Senator, represents publicly owned electric utilities around the country. They are located in 49 States, and we represent the interests of around 1700 of those systems.

APPA supports the repeal of Title II of the Fuel Use Act because the Association believes that it would result in the following benefits:

First, it allows electric utilities to use generating technology which has significant ability to hold down costs. This is true because gas-fired combined cycle plants are available in modular sizes which permit a utility to more closely track load growth, have short lead times at low capital costs, provide fuel flexibility and competition, and offer higher efficiency power production.

Second, it offers another way to deal with environmental problems, including acid rain. Gas-fired generation produces virtually no sulfur dioxide, no particulates, no ash, no scrubber sludge, and much lower nitrogen oxide emissions than coal.

Third, it presents the prospect of using higher sulfur coals in a manner which is environmentally and economically attractive through coal gasification. This process might result in other useful byproducts including elemental sulfur, road-building material, and methanol for fuel, feedstock for chemicals, and fertilizer.

I should say, Senator, that our view of how these decisions should be made parallels very closely the views of Mr. Woodcock. That is, all electric utilities are looking for the low-cost, least-cost alternative to supply their next increment of power supply. If natural gas can do the job in that regard, then it should be compared favorably with the prospects of coal.

In both cases, the product is something the electric utilities are going to use in continuing amounts. There is no way that natural gas is going to replace coal as far as future load growth is going to be concerned. The two are there together, and both of them are going to be utilitized.

Both of them may be utilized in smaller amounts than we anticipated. I think some of the projections made by both coal and natural gas interests based on what they think might happen in the electric utility generating business may be too optimistic.

This Committee and the Congress has recently approved a move to try and increase the efficiency of our energy appliances throughout the country. I think that was a good move. It was a move that our Association endorsed and we supported that bill, which has gone to the President. I think it will have an impact. I think it will decrease the amount of electricity, or at least slow the rate of growth in the use of electricity in the United States, and that has favorable aspects not only for consumers but for our environmental problems, too.

I think we ought to recognize furthermore that we have a situation where co-generation is increasingly becoming a major factor as far as the supply of electricity is concerned. According to testimony by the Economic Regulatory Administration last year, only one out of seven co-generation projects are actually affected by the Fuel Use Act.

What that means is that many co-generation projects are going forward, and in numerous cases they are using natural gas as their fuel and supplying electricity which is then purchased by electric utilities at avoided cost. In some cases, that avoided cost turns out to be referenced on a plant which is higher cost than the alternative which the utility itself could produce.

To the extent that happens, consumers pay a penalty. But we are not writing on a clean slate in this regard as it relates to natural gas and the production of electricity through combustion turbines, and even combined cycle machines.

Lastly, I would suggest that one of the things that would be useful to the coal industry as far as future use of electricity by the electric utility industry is concerned would be if we can do something to open up accesse on transmission systems throughout this country.

There are many opportunities to utilize coal in mine-mouth facilities and pipe that energy by wire to an area that needs the supply, and we have not taken full advantage of that chance.

Thank you, Mr. Chairman.

[The prepared statement of Mr. Hobart follows:]

AMERICAN PUBLIC POWER ASSOCIATION
2301 M STREET NW WASHINGTON DC 20037

Statement of
Larry Hobart, Executive Director,
AMERICAN PUBLIC POWER ASSOCIATION
before the
SENATE COMMITTEE ON ENERGY AND NATURAL RESOURCES,
SUBCOMMITTEE ON ENERGY REGULATION AND CONSERVATION
on

REPEAL OF TITLE II OF THE FUEL USE ACT

March 12, 1987

My name is Larry Hobart. I am the Executive Director of the American Public Power Association. APPA is the national trade association of 1,750 local publicly owned electric utilities throughout the country. Public power systems provide electric service to 13.6 percent of the national population, and own 10.2 percent of installed generating capacity. This generating capacity is based upon a wide range of fuels, including falling water, uranium, coal, and natural gas.

I will address my comments to the provisions of S. 85 which would repeal the prohibitions of the Fuel Use Act on the use of natural gas and oil by new electric powerplants, and to the developments in fuel markets and the electric utility industry since 1978 which dictate the repeal of the end-use prohibitions of FUA in 1987.

In the last 20 years, utilities have built much new generating capacity in the form of large nuclear and coal-fired plants. These plants are usually large -- 500 to 1,000 MW or more -- because conventional nuclear and coal-fired plants provide significant economies of scale.

But planning and construction of new generating capacity has slowed down in recent years. There are several reasons: load growth has declined from a historically dependable 7 percent annual rate up to the early 70s to about 2 percent in 1986. Load growth has become hard to predict: guessing wrong has resulted in substantial overcapacity in some regions. The nuclear option is not now viable for new units. Both the availability and price of fossil fuels other than coal were for some years too uncertain to permit capacity planning based on them. Another strong disincentive to their consideration has been the restrictions of the Fuel Use Act, which have continued even though it has become clear that natural gas is not disappearing, but abundant, and will probably remain so for a long time to come.

Thus, utility choices have narrowed to one: large conventional coal-fired powerplants. But exclusive reliance on coal requires placing large amounts of capital at risk, based on projections of need ten or more years in advance, and that risk is unjustifiable without high confidence in the reliability of regional load forecasts.

The nation's present surplus of generating capacity is not likely to continue much beyond the early 1990s. Utilities must plan now to meet new demand. The only sensible approach in uncertain circumstances is conservative: to add generating capacity as the need for it is clear, in small increments with short lead times.

Further, the choice of generating options must be broadened so that the method by which electricity is provided is tailored to the need, both economically and environmentally. There must be a choice of fuels, not one fuel alone, to ensure the benefits of competition to consumers: with more fuels available, utility fuel buyers gain leverage to hold prices down. All fuel prices rise and fall with the price of oil, but flexibility in fuel choices gives utilities maneuvering room and bargaining power.

Utilities are increasingly averse to both high-risk and high-cost strategies. But the option of natural gas no longer entails the risk of shortage faced in the 1970s, for three reasons: (1) with the passage of the Natural Gas Policy Act, gas producers can and will respond to increased demand with increased drilling and production, and projections of supply availability are very favorable; (2) natural gas is almost entirely a domestic fuel, and potential imports originate not from the Middle East, but from neighboring countries; and (3) in the event of high gas prices, or low coal prices, utilities have the option of switching to gasified coal in highly efficient combined-cycle generating plants.

At the same time, limiting utilities to the sole option of conventional coal plants means high cost for consumers: where gas-fired combined-cycle units are the most efficient, cleanest, most economical form of new generation, their exclusion means that consumers will pay higher costs for power, both in electric rates and in environmental pollution.

Locking utilities into one fuel and one type of powerplant forces electricity prices up by cutting competition in more than one way: first, by eliminating the need to meet interfuel competition for coal producers; and, second, by keeping the "avoided" cost of power high in states which now peg avoided cost rates to the high cost of new coal plants. With the dice thus loaded, cogenerators may build gas-fired plants, but reap coal-fired prices; utilities may back out cheaper sources -- even hydropower -- to buy cogenerated power; and consumers must pay for windfalls.

Fuel Use Act repeal addresses both problems: coal and cogenerators would have to meet genuine competition to deliver the most efficient, economical product to consumers.

Coal producers have argued, in opposing any effective FUA repeal measure, two mutually inconsistent positions: first, that powerplants must be (conventionally) "coal capable" because gas may run out and/or rise in price, and, second, that coal gasification will not be done because the conditions that justify it will not exist -- that is, shortage or higher prices. In fact, the purpose and effect of these arguments would be to protect coal markets from the discipline of competition. The suppression of competition to protect coal markets was not a purpose of the Fuel Use Act -- and is not a defensible principle for public policy now.

Although gas-fired combined-cycle generation is now a desirable generating option, conventional coal generation will continue to be chosen for a high proportion of new capacity because capacity decisions are plant-specific: they depend, among other factors, upon the relative supply, quality, and price of the coal and/or gas available to a particular utility.

Both the recent performance of coal and future demand projections show bright coal markets: coal accounted for 46.3 percent of U.S. generation in 1976, but 55.8 percent in 1986; oil declined from 15.7 percent to 5.5 percent in the same decade; and natural gas went from 14.5 percent to 10 percent. Repeal of FUA will not affect any of the last decade's coal additions.

Right now, more than 30,000 MW of coal capacity are planned over the next decade; nearly 20,000 MW of this capacity is under construction.

At the same time, combined-cycle powerplants, the technology of choice for efficient gas combustion, can be made fully coal capable. When economics justify switching from natural gas to gasified coal, they can utilize a range of coals, including high-sulfur, low-cost coal, to produce clean coal-based electricity. This will offer a new future market for the high-sulfur coal mining industry.

In the case of "select use" of natural gas with coal for pollution control, gas can boost the competitiveness of high sulfur coal. Natural gas produces virtually no sulfur dioxide, no particulates, no ash, no scrubber sludge, and much lower nitrogen oxide emissions than coal. "Select use" of gas can in many cases cut SO_2 emissions at a fraction of scrubber costs per ton of reduction.

The Fuel Use Act Exemption Process

FUA prohibits new powerplants from using oil or gas, and requires that new powerplants be built with the "capability" to use coal. Under other FUA provisions, utilities have been granted exemptions from these prohibitions. Most of these exemptions have been for cogeneration and peakload use of natural gas -- relatively simple exemptions.

But FUA remains a counterproductive and time-consuming obstacle to the use of gas. With time for preparation of applications (3-6 months) and federal processing (5 months average), FUA adds up to one year of lead time for a new project. There is no FUA exemption for baseload use of gas; no exemption for select use of gas; no exemption for combined-cycle generating units.

A recent application by Virginia Power Company for an exemption for a new baseload 400-MW gas-fired combined-cycle plant has been challenged at the Economic Regulatory Administration by the National Coal Association. NCA has reportedly threatened to contest other exemptions as well. The NCA challenge means more delay and more uncertainty for exemption applicants.

It also means that the argument that FUA repeal is unnecessary since exemptions are easily obtained can no longer be sustained. Planners reluctant to depend on exemptions from law for vital projects will rightfully be doubly skeptical so long as future exemptions may be entangled in regulatory hearings and litigation.

Integrated Gasification -- Combined-Cycle Plants: Phased Growth

Combined-cycle electric generating plants are a vital technology for the future. They allow economical new capacity to be added in small increments as needed; thus, the risks to ratepayers of too much and too little generating capacity can be minimized. A combustion turbine plant can be installed for peaking use first, if desired. This phase takes one year and costs about $280 per kilowatt of capacity, according to Electric Power Research Institute (EPRI) studies.

For baseload generation, a heat recovery steam generator and steam turbine can be added, using the waste heat from the combustion turbine to boost plant output by one-third without additional fuel. According to General Electric, operating in combined cycle, a 210 MW combined-cycle plant can produce electricity at a heat rate of about 7,500 Btus per kilowatthour -- or 45.6 percent efficiency. This is the most efficient fossil-fuel generating technology available. The total cost of the combined-cycle plant is about $630 per kilowatt of capacity, and its total construction time is 2-3 years.

At this stage, the plant uses natural gas. If and when coal prices fall enough below gas prices, a coal gasification system can be added to create a coal-burning powerplant. The gasification facility adds no generating capacity, but raises the total capital cost of the plant to run on coal to about $1,600 per kilowatt, according to EPRI studies.

The best long-term payoff of integrated gasification -- combined-cycle (IGCC) plants is their cleanliness; the Cool Water IGCC plant in California is now perhaps the cleanest coal-fired plant in the world. IGCC plants can use high-sulfur, lower cost coals, and they emit a small fraction of the sulfur dioxide and nitrogen oxide produced by a pulverized coal plant.

In comparison, a conventional pulverized coal generating plant is usually larger, thus cannot offer incremental generating additions; will cost about $1,200-$1,600 per kilowatt of capacity; is 34 percent efficient, with a heat rate of 10,000 Btus per kilowatthour; and takes 10 years to construct.

The "Coal Capability" Issue

Proponents of "coal capability" would permit utility use of natural gas or oil contingent upon its combustion in a boiler designed to burn coal. Combined-cycle generation would be excluded: combustion turbines cannot use coal unless gasified.

The effective result of such a requirement would be the retention of FUA exactly as it is. Although coal industry spokesmen state their willingness to leave the actual choice of the fuel used in the new coal boilers "up to economics," the economics dictate the use of none other than coal in a coal boiler.

A plant designed for coal combustion, and burning natural gas, has three strikes against it: higher capital costs than a combined-cycle plant; more expensive fuel per Btu than coal; and less efficient combustion than combined-cycle provides. "Coal capability" therefore means that utilities would be free, under FUA, to pay more for fuel, and free to burn it wastefully in a more expensive powerplant.

The economics of using gas depend upon lowering its cost, relative to coal costs, per unit of electrical output. That is what a combined-cycle plant does by lowering the number of Btus needed to generate a kilowatthour of energy. You use less gas, so it's cheaper. The extra per-Btu cost of gas is further offset by the low capital cost of combined-cycle powerplants: the net result for consumers is lower electric rates.

Advocates of a "coal capability" requirement have argued that over the life of a powerplant "new capital-intensive coal-fired coal plants" are "clearly the cheapest alternative," in the words of a coal industry witness in congressional testimony last year.

This is "clearly" so only if (1) gas shortage and very high prices are a certainty, which they are not; and (2) delivered coal prices remain moderate, which is not a certainty; and (3) life cycle costing would not justify converting a combined-cycle plant to coal through a gasifier.

But the coal industry's life-cycle crystal ball has blinders: a gas-fired coal boiler which does not later need to convert to coal will represent a large waste of money and fuel, not the "cheapest alternative."

And, of course, the claim that plants built to burn gas cannot convert to coal is untrue: combined-cycle plants can be made fully coal-capable through coal gasification.

Repeal of the end-use restrictions of the Fuel Use Act is good for consumers, who will benefit through lower electric rates; is good for the environment, which benefits through the low pollution of gas combustion; and does no harm to the coal mining industry, which, though it will face competition as it always did in the past, will enjoy new markets for both conventional, and integrated gasification -- combined-cycle, power generation.

APPA urges the members of the subcommittee to support S. 85, and to reject crippling "coal capability" requirements for powerplants.

Senator **Ford**. Well, they just turned the lights out. I guess we are off of television.

[Laughter.]

Senator **Ford**. Sorry about that.

Mr. Woodcock, did I understand you to say that it was difficult for you to get long-term gas contracts?

Mr. **Woodcock**. That is correct, the long-term gas contract that we consider to be stable and would ultimately protect ratepayers—i.e., having escalators that in fact would track general inflation.

Senator **Ford**. Mr. Harlow, you say you have roughly 50–50, and you switched from natural gas to coal because you said you liked to have the alternatives. How much of the natural gas that you are receiving is so-called "transportation gas"?

Mr. **Harlow**. Senator, in our case being in the oil patch we buy directly from the wellhead, so we do not generally buy from pipelines. We are buying from——

Senator **Ford**. Well, it has to be tranported by the pipeline, so that is transportation gas then.

Mr. **Harlow**. We own our pipeline.

Senator **Ford**. Is it your own pipeline?

Mr. **Harlow**. It is our own pipeline.

Senator **Ford**. So you are not involved in any transportation.

Mr. **Harlow**. No, sir.

Senator **Ford**. Mr. Hobart, you talk about other uses, and about coal gasification, and I guess fluidized bed combustion operations, and that sort of thing. Would this amendment that we are talking about, if you heard Mr. Farrand earlier, would that amendment to this piece of legislation bother you too much?

Mr. **Hobart**. The amendment, as I understand it, has two parts, Senator. One relates to boilers. Dealing with that particular situation, I think there is a significant cost penalty that would be incurred in order to implement that particular part of the proposal.

Senator **Ford**. I agree that there will be a cost, but I am not sure it is not what you and I would term significant, on boilers now, just on boilers.

Mr. **Hobart**. I would call it significant. We would be glad to try and tell you, to quantify that figure so that you could look at it, too.

The second part of the amendment, if I understood Chris correctly, would relate to combined cycle machines. His suggestion is that there be a requirement that the machine have an ability to use syngas at some point in its life if that turns out to be economically desirable.

Senator **Ford**. That is correct.

Mr. **Hobart**. I do not think it is necessary to put that provision into a law, because I think if our understanding of the cost element there is correct, it is a quite likely prospect in any event; because the lesson of the 1970s for utilities was (a) you live in an age of uncertainty; and (b) what you want is flexibility.

I think it is quite likely that we would see this pattern represented in utility decisions.

Senator **Ford**. I do not think that we worry about the turbines too much. It is the land for the gasifier, and that does not necessarily have to be on site. It could be offsite. I do not think you want it too far, but the land that would be available for construction of the gasifier.

Senator Nickles, do you have any questions?

Senator NICKLES. Thank you, Mr. Chairman.

To our panelists, being on the last panel it is not likely that you would have as many Senators, but I appreciate the statements that you made.

Mr. Woodcock, I missed your statement——

Senator FORD. And it was a good one, too.

Senator NICKLES. I understand that it was.

I might also ask you, you are in the process of a plant in eastern Oklahoma?

Mr. WOODCOCK. That is correct.

Senator NICKLES. That is a coal plant?

Mr. WOODCOCK. That is correct.

Senator NICKLES. The basic part of your statement is that you think that coal is very much, for at least baseload plants, the most advantageous fuel?

Mr. WOODCOCK. Correct, as we look at a baseload plant that is going to serve 30 years or so, we find that coal on a present-worth basis is the least costly.

Senator NICKLES. So the Chairman might—I do not have any problem with that. I do not want to legislate a preference one way or another, but certainly if it is your decision and you are building a plant, whether it be in Oklahoma or any place else, I would hope that you or whoever else would be your counterpart that is making that decision would be able to use whatever your estimations are, and if you think coal in your judgment because of the supply and possible variations in gas prices or whatever, if that is the best option for you I say that is great.

I just think that you all should be making those decisions. I do not think it should be preempted, or mandated, or legislated by us.

Would you agree with that?

Mr. WOODCOCK. Yes, I certainly would.

Senator NICKLES. Would you support this legislation to repeal the Fuel Use Act?

Mr. WOODCOCK. Yes, we were invited up on the grounds that we would merely provide our views on the competitiveness. I think Roger Sant, our president, clearly for a long time has said that the Fuel Use Act is interference in competitive markets and therefore possibly does not play a constructive role. At the same time, I think we probably do have some concerns if it was removed by itself that there could be a strong incentive to purchase a lot of gas-fired capacity, and that could over the long term be more costly than coal. So I guess we really did not come today with a specific legislative recommendation.

Senator NICKLES. You say you really did not come up here with a specific recommendation?

Mr. WOODCOCK. That is correct.

Senator FORD. He was just showing the difference.

Senator NICKLES. I understand, but did you also say that you would support repeal of the Fuel Use Act?

Mr. WOODCOCK. I did say that clearly it is part of Roger Sant's views that government interference in energy markets is not a good thing, and therefore it is best to have less regulation, and therefore things like the Fuel Use Act.

Senator NICKLES. Mr. Harlow, you mention in your statement the ability or flexibility for you to be able to make those decisions. You also mentioned that about half your power was coal, and about half gas?

Mr. HARLOW. Yes.

Senator NICKLES. Not gas and oil, but half gas and half——

Mr. HARLOW. Half natural gas, and about roughly half coal.

Senator NICKLES. Now you have a lot of large stations, as AES is putting in a significantly sized plant. Those large stations are both gas and coal?

Mr. HARLOW. Yes.

Senator NICKLES. Now if you needed an incremental or a small incremental unit, if you do not really see the need at this time for a larger megawatt unit, but maybe a smaller peak load unit, what would your desire be at this time to purchase?

Mr. HARLOW. We believe right now that the combustion gas turbine is the answer for the peaking units that we are going to be looking at in the early 1990s, or the middle 1990s, I guess, and of course the combined cycle option lets you add pieces onto it as you shift from say peaking on that unit to intermediate load to finally baseload. So that it is an option that gives us a lot of flexibility. It keeps us from having rate shock by having to put on big pieces at a time.

On the other hand, if in the future, let us suppose our load growth starts to pick up, we will need bigger pieces at one time, in which case we could again go back to building large coal units. In fact, we have a coal unit in our plans, it is up past the year 2000 right now, but it would be a pulverized coal plant as we plan it today.

So what we are doing is not necessarily moving away from the coal option at all, but we think with our load growth and the circumstance we are in, the availability of gas, this is a tremendous option. That is going to vary somewhat around the United States, and I do not believe, as Mr. Woodcock does, that there will be too much gas generation done. I think that is going to vary between places, because I believe our people in our industry are going to make these decisions based on their own circumstances, their own availability of fuels, and their own judgments as to the future.

Senator NICKLES. Now you have a large plant—I am thinking of the Sooner plant—that is a fairly new coal plant. Would you keep that? If the Fuel Use Act was repealed, would you keep all the coal plants that you now have in coal?

Mr. HARLOW. We will keep them. We will baseload them. They will be running, because the fuel price on those is about $1.50 or $1.60. The price for natural gas is $2-and-something, and even in the spot market it often does not get below $1.50. So our long-term contracts are in the $2 range. You get down in the spot range—we are not buying a lot of spot right now because we have longer term contracts—but we do do some of that. But I would say at this time there would be no change in those units. They would still be baseloaded, and I think that is true of our whole industry.

As I say, 57 percent of the electricity in the United States is now produced by coal, and that will not change.

Senator **Nickles**. I appreciate your comment, because I think there have been some fears expressed that, well, because the spot prices of gas are down, most of those coal contracts that are signed, as I know is your case with Sooner, you are buying what Wyoming coal?

Mr. **Harlow**. These are Atlantic Richfield. Yes, Wyoming coal.

Senator **Nickles**. Wyoming coal. Those are what term of contracts?

Mr. **Harlow**. Those are about 20-year contracts.

Senator **Nickles**. 20-year contracts? So most of those, where you take I am going to say the Midwest coal-fired plants, most of those that are buying the low sulfur Wyoming and Montana coal are in that area. Those probably are long-term contracts, and my guess would be with significant provisions that would not allow those to be abrogated to take advantage of a temporary swing in prices.

Mr. **Harlow**. In our case we have take-or-pay clauses that require us to continue to take coal and—well, gas, too—but we have take-or-pay in coal that requires substantial takes so that we will make sure that these contracts will be honored for sure.

Senator **Nickles**. Now you mentioned that if you were to add a small incremental unit that you would use a combined cycle turbine?

Mr. **Harlow**. Yes.

Senator **Nickles**. Which would be burning gas. What would the feasibility—or would the feasibility of that unit go down substantially if you were mandated to have it be coal-capable, as compared to having a gas fired turbine on the front?

Mr. **Harlow**. The EPRI document that I just read a few minutes ago, and I am sorry that I am not—we have not bid any of these units yet, so I am not as familiar with them as I will be eventually--but it indicates that the cost for the turbine itself is not all that prohibitive.

That is, the sizing and the blades do not seem to be that large a problem. What we are going to get into——

Senator **Ford**. Mr. Harlow, was that figure you got about $500,000 difference?

Mr. **Harlow**. That is what has been quoted here today, and I really cannot verify it except that that is the number that is being used, and that seems to be about what people believe.

I would like to file something later, if that is not the case, if that would be permissible, Mr. Chairman.

Senator **Ford**. That would be fine.

Mr. **Harlow**. But the facts are that we believe that that part of it seems to be all right. But I think even with or without that, it seems to me that we should have the option as to whether to buy those turbines that way, whether or not to arrange the siting, those things should be left up to the individual utility.

I cannot predict what the future is going to bring, but I think I and the people that work with me are going to work very hard at trying to fit our particular circumstance. That will vary each place in the United States. So we believe that this should be an option that we have to follow; but we believe that that kind of thing is available. This is a little different testimony than last year when we were talking large and small boilers, which is different from last year.

Senator NICKLES. I understand. Mr. Hobart, do you support repeal of the Fuel Use Act?

Mr. HOBART. Yes, Senator. We support repeal of Title II of the Fuel Use Act.

Senator NICKLES. Do you feel legislatively mandating some of these options for coal capability would be quite expensive?

Mr. HOBART. I just answered a similar question of Senator Ford. With respect to boilers, yes, I think there would be a significant economic penalty. But I also indicated that it would be my belief that most utilities would want to build into a combined cycle the opportunity to use syngas at some spot in the future if that turned out to be the economic choice, and that would happen automatically and is not required to be mandated to achieve the result that you wish.

Senator NICKLES. I thank you.

Mr. Chairman, thank you very much.

Senator FORD. Fine. I think we might make a point that you were not here when Mr. Woodcock said one of his difficulties was getting long-term natural gas contracts. Mr. Harlow owns his own gas. So it would be transportation gas. And I suspect, Mr. Harlow, with your long-term contracts with Wyoming coal that that basically would be compliance coal.

Mr. HARLOW. Yes, sir. It is compliance coal, 0.03 sulfur.

Senator FORD. Fine.

I thank you gentlemen very, very much.

We want to leave the hearing record open for possible submissions of members' additional questions.

I want to put it on the record that tomorrow will be the last—no, it will be two weeks. Friday of next week would be the last day we would have questions submitted. We would like to have them the Friday prior to the markup back here so we can use your answers to any questions for the markup of this piece of legislation. We do thank you. You all were very helpful to us today. In fact, I wish others could have been here to hear you.

[Whereupon, at 1:28 p.m., the hearing was adjourned.]

APPENDIXES

APPENDIX I

Responses to Additional Committee Questions

BENNETT JOHNSTON, LOUISIANA, CHAIRMAN
ARKANSAS
FORD, KENTUCKY
M. METZENBAUM, OHIO
MELCHER, MONTANA
L BRADLEY, NEW JERSEY
JEFF BINGAMAN, NEW MEXICO
TIMOTHY E. WIRTH, COLORADO
WYCHE FOWLER, JR., GEORGIA
KENT CONRAD, NORTH DAKOTA
JAMES A. McCLURE, IDAHO
MARK O. HATFIELD, OREGON
LOWELL P. WEICKER, JR., CONNECTICUT
PETE V. DOMENICI, NEW MEXICO
MALCOLM WALLOP, WYOMING
FRANK H. MURKOWSKI, ALASKA
DON NICKLES, OKLAHOMA
CHIC HECHT, NEVADA
DANIEL J. EVANS, WASHINGTON

DARYL H. OWEN, STAFF DIRECTOR
D. MICHAEL HARVEY, CHIEF COUNSEL
FRANK M. CUSHING, STAFF DIRECTOR FOR THE MINORITY
GARY G. ELLSWORTH, CHIEF COUNSEL FOR THE MINORITY

United States Senate
COMMITTEE ON
ENERGY AND NATURAL RESOURCES
WASHINGTON, DC 20510-6150

1987 MAR -4 AM 11: 25
FEDERAL ENERGY
REGULATORY COMMISSION

March 3, 1987

The Honorable Martha O. Hesse
Chairperson
Federal Energy Regulatory Commission
825 North Capital Street
Washington, DC 20426

Dear Commissioner Hesse:

I would appreciate it if the Federal Energy Regulatory Commission could provide me with an opinion on the following question:

> If there is a supply shortage in a service area which includes a large gas user who has an independent supply contract with a broker or a producer, and a carriage arrangement with a pipeline, can the FERC apply priorities to curtailment of that gas in that system?

Since your response will be useful for a hearing to be held by the Subcommittee on Energy Regulation and Conservation in the near future, I request that you provide me with an answer no later than Monday, March 9.

If you or any member of your staff requires additional information on this request, please contact Bob Roach of my staff at 224-2315.

Thank you for your attention to this matter.

Very sincerely yours,

Howard M. Metzenbaum

Howard M. Metzenbaum
Chairman, Subcommittee
on Energy Conservation
and Regulation

HMM/rrg

FEDERAL ENERGY REGULATORY COMMISSION
WASHINGTON, D. C. 20426

CHAIRMAN

March 10, 1987

Honorable Howard M. Metzenbaum
United States Senate
Washington, D.C. 20510

Dear Senator Metzenbaum:

Thank you for your letter of March 3, 1987, inquiring about application of the Federal Energy Regulatory Commission's curtailment priorities in the event of "a supply shortage in a service area which includes a large user who has an independent supply contract with a broker or a producer, and a carriage arrangement with a pipeline."

When a supply shortage occurs on an interstate pipeline, the allocation of supply is performed pursuant to the priorities of service in the pipeline's curtailment plan which is part of its approved FERC Gas Tariff. Additionally, when a shortage of capacity occurs for transportation use, capacity is allocated pursuant to tariff sheets containing either priorities unique to the particular pipeline, or, for those pipelines which have accepted open access status, priorities in conformance with the Commission's Order No. 436. Pipelines with open access transportation must treat firm sales and firm transportation alike and interruptible sales and interruptible transportation alike.

However, pipeline tariffs do not and cannot legally provide for the allocation of a shipper-owned supply (which is under a "carriage arrangement") to some other natural gas user who may be suffering from a gas supply shortage.

The only Federal authority applying priorities to shipper-owned gas in a pipeline (i.e. allocating that gas to some other user) is found in Title III of the Natural Gas Policy Act of 1978. Under that Title (Section 303), if the President first declares a natural gas supply emergency endangering the supply of high priority uses, then shipper-owned supplies in interstate pipelines can be allocated for the protection of "high priority uses." High priority use is defined as volumes for a residence or commercial establishment using less than 50 Mcf on a peak day and any use the curtailment of which the President determines would endanger life, health or maintenance of physical property.

Allocations under this provision are, first, certain boiler fuel supplies, then supplies flowing through interstate pipelines, including shipper-owned supplies, that are used to generate electricity, then other flowing supplies not needed for high priority uses, including shipper-owned gas. Allocations to high priority users of shipper-owned gas may be ordered under this provision only so long as an equally high priority shipper-owner is not thereby adversely affected.

If I may be of further assistance in this or any other Commission matter, please do not hestiate to let me know.

Sincerely,

Martha O. Hesse

J. BENNETT JOHNSTON, LOUISIANA, CHAIRMAN

DALE BUMPERS, ARKANSAS
WENDELL H. FORD, KENTUCKY
HOWARD M. METZENBAUM, OHIO
JOHN MELCHER, MONTANA
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GARY G. ELLSWORTH, CHIEF COUNSEL FOR THE MINORITY

United States Senate
COMMITTEE ON
ENERGY AND NATURAL RESOURCES
WASHINGTON, DC 20510

March 13, 1987

Mr. Chris Farrand
Vice President, Government Relations
Peabody Holding Co.
1120 20th St., N.W.
Suite S-720
Washington, D.C. 20036

Dear Chris:

Enclosed please find additonal questions that have been submitted for the hearing record of the March 12 hearing on S. 85. We would appreciate having your responses no later than a week from today, March 20, so that they will be available to the members prior to the Committee's next Business Meeting on March 25 when S. 85 will be on the agenda.

Thank you for your testimony and we look forward to hearing from you again soon.

Sincerely,

Howard M. Metzenbaum

Howard M. Metzenbaum
Chairman
Subcommittee on Energy Regulation
and Conservation

HMM/bm
Enclosure

ADDITIONAL QUESTIONS FROM SENATOR JOHNSTON

QUESTIONS FOR CHRIS FARRAND (PEABODY COAL/NATIONAL COAL ASSN.)

Please provide your best estimates of the cost of your "coal convertability" suggestion.

a. How much per kilowatt (or megawatt) of installed capacity does a new, large-scale conventional natural gas boiler powerplant cost?

b. How much would making such a boiler "coal convertible" add?

c. If the utility were ever to use coal in the powerplant, it would have to install the pollution control equipment. How much would that add?

d. How much would a medium-size gas turbine powerplant with an installed capacity of 250 megawatts cost?

e. How much would making the powerplant "coal capable" (as you have defined it) cost?

f. If the utility were ever to use coal in the powerplant, it would have to install the additional equipment. How much would that cost?

g. According to the most recent data available from the Energy Information Administration's Electric Power Monthly (November, 1986) the average costs of gas and oil used to generate electricity last year were $2.36/mmbtu and $2.38/mmbtu respectively. The average cost of coal was $1.60/mmbtu. Given those relative price differences, and assuming that the price of both fuels increases at a rate equal to inflation, how long would it take for a utility to make up the difference in the increased capital cost of a coal-capable plant due to the lower fuel cost of coal? In other words, when would consumers realize a benefit from using coal? Please factor in the increased operating costs of cost vis a vis gas or oil.

ADDITIONAL QUESTIONS FROM SENATOR FORD

QUESTION FOR CHRIS FARRAND

1. Could you please describe what needs to be done to a conventional gas fired turbine to make it capable of using synthetic gas manufactured from coal?

2. Are the component parts necessary to handle synthetic gas in turbines currently being manufactured? Are they readily available?

ADDITIONAL QUESTIONS FROM SENATOR METZENBAUM

QUESTION FOR AMERICAN PUBLIC POWER ASSOCIATION, EDISON ELECTRIC INSTITUTE, NATIONAL COAL ASSOCIATION, AND APPLIED ENERGY SERVICES

A number of panelists stated that gas-fired plants can be brought on line much more quickly than coal-based facilities. Please detail your reasons for agreeing or disagreeing with their assertion.

ADDITIONAL QUESTIONS FROM SENATOR METZENBAUM

QUESTION FOR AMERICAN PUBLIC POWER ASSOCIATION, EDISON ELECTRIC INSTITUTE, NATIONAL COAL ASSOCIATION, AND APPLIED ENERGY SERVICES

Panelists disagreed on the question of whether coal-based electrical generating facilities are cost-competitive with gas-fired plants. What are the reasons for this difference of opinion?

PEABODY HOLDING COMPANY, INC.

1120 20th Street, N.W.
Suite S-720
Washington, D.C. 20036
(202) 659-8101

CHRISTOPHER G. FARRAND
Vice President
Government Relations

March 20, 1987

The Honorable Howard M. Metzenbaum
Chairman, Subcommittee on Energy
  Regulation and Conservation
United States Senate
212 Hart Senate Office Bldg.
Washington, D. C. 20510

Dear Mr. Chairman:

Enclosed are responses to written questions submitted to me on behalf of yourself, Senator Johnston and Senator Ford in conjunction with the March 12 hearing on S. 85, a bill to repeal provisions of the Powerplant and Industrial Fuel Use Act.

The response to Senator Johnston's final question (question g) is not included, as we are awaiting completion of some more detailed analysis. This response will be forthcoming no later than Monday, March 28.

Sincerely,

Chris Farrand

Chris Farrand

CF:mm

Enclosures

RESPONSES TO QUESTIONS FROM
SENATOR JOHNSTON

Question (a) How much per kilowatt (or megawatt) of installed capacity does a new, large-scale conventional natural gas boiler powerplant cost?

RESPONSE: According to EPRI, a 500 megawatt (2 units) steam powerplant would cost about $714 per kilowatt of capacity (1984 dollars). This cost includes the total plant cost, as well as land, inventory and start-up costs. I have attached an exhibit taken from EPRI's Technical Assessment Guide (EPRI P-4463-SR, December 1986), a document used for calculating or estimating technology costs. Exhibit B.5-23 attached calculates the cost of a distillate-fired or liquid fuel fired powerplant; these estimates are similar to those which would be applied to a gas-fired steam powerplant.

Question (b) How much would making such a boiler "coal convertible" add?

RESPONSE: The EPRI Technical Assessment Guide estimates that a fully coal-capable steam power plant of 1000 MW would cost about $1143 per kilowatt of capacity (1984 dollars). However, the proposed Ford Amendment would require only the addition of equipment necessary to allow for "coal convertibility". Using estimates obtained from a major powerplant engineering firm, we have calculated the incremental cost of "coal convertibility" to be approximately $170 per kilowatt; hence, the total cost of a coal convertible powerplant would be $884/kw, substantially less that the $1143/kw estimated for a new, fully-capable coal plant.

The $170/kw cost is derived by calculating the difference between the cost of a conventional coal plant with FGD equipment as a gas-fired conventional steam powerplant and multiplying that difference by .4.

Using specific examples, a major powerplant engineering firm has estimated that the necessary inherent design characteristics of "coal convertibility" in a steam powerplant constitute approximately 40 percent of the differential cost between a gas-fired steam plant and a fully-equipped coal-fired unit ($1143/kw - $714/kw = $439/kw x .4 = $170/kw).

gas or oil-fired steam powerplant =	$714/kw
additional cost for "coal convertibility =	170/kw
TOTAL	$884/kw

Question (c) If the utility were ever to use coal in the powerplant, it would have to install the pollution control equipment. How much would that add?

RESPONSE: Current estimates of the cost of pollution control equipment, primarily a flue gas desulfurization unit ($115/kw) and a precipitator ($50/kw) are approximately $165/kw. The installation of the bottom ash/fly ash disposal system would add $15/kw. Hence, the total pollution control cost would be approximately $180 per kilowatt of capacity. We reiterate that this added equipment would only be necessary if and when coal were actually burned in the unit.

Question (d) How much would a medium-size gas turbine powerplant with an installed capacity of 250 megawatts cost?

RESPONSE: EPRI's Technical Assessment Guide estimates the cost of a 250 megawatt gas turbine powerplant at $295 per kilowatt of capacity (Exhibit B.5-26). The cost of a combined cycle facility, adding a waste heat boiler and generator, would be $484/kw (Exihibit B.5-25).

Question (e) How much would making the powerplant "coal capable" (as you have defined it) cost?

RESPONSE: We are told that current gas turbines, primarily General Electric's Frame 7 model, can accommodate synthetically-produced gas. Modifications would be required at the time the gasifier is installed;

these modifications include a new fuel manifold, fuel nozzles, combuster baskets, combustor casings and unit control modifications. The estimated cost of these modifications range between $500,000 and $3,000,000 depending upon the size of the unit. However, since these modifications do not have to be made at the outset, there is no additional cost attributable to "coal convertibility" of such a unit, except the land area required as a reserve for possible installation of a coal gasifier.

Question (f) If the utility were ever to use coal in the powerplant, it would have to install the additional equipment. How much would that cost?

RESPONSE: The EPRI Technical Assessment Guide estimates a complete Integrated Gasification-Combined Cycle Powerplant (Texaco type - 500 MW) would cost $1576 per kilowatt of capacity. Without allowing for the difference in size, and by substracting the $484/kw already sunk in the combined cycle units, we calculate the incremental cost of full coal-capability (the gasifier) at $1092/kw (see Exhibit B.5-13 attached).

Supplemental Response to Senator Johnston

Question (g): According to the most recent data available from the Energy Information Administration's Electric Power Monthly (November, 1986) the average costs of gas and oil used to generate electricity last year were \$2.36/mmbtu and \$2.38/mmbtu respectively. The average cost of coal was \$1.60/mmbtu. Given those relative price differences, and assuming that the price of both fuels increases at a rate equal to inflation, how long would it take for a utility to make up the difference in the increased capital cost of a coal-capable plant due to the lower fuel cost of coal? In other words, when would consumers realize a benefit from using coal? Please factor in the increased costs of coal vis a vis gas or oil.

RESPONSE:

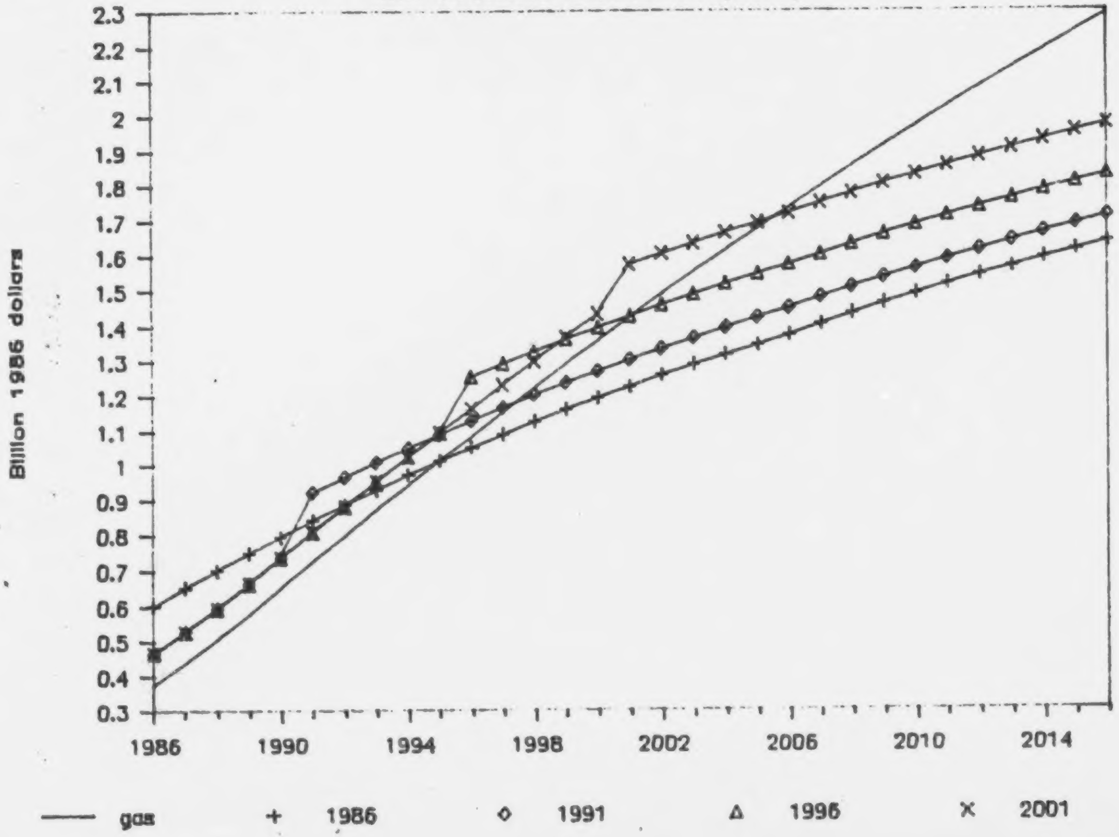
If the fuel price differential listed in the question is projected to remain as is over the life of a powerplant, the lower cost of coal cannot overcome the capital cost advantages of gas when costs are considered on a life-of-plant basis. However, if commonly-accepted fuel price indices are used, the cumulative 30-year cost of a gas or oil-fired steam plant or a combined cycle powerplant (without gasification) exceeds the life-cycle cost of a coal-capable facility. The difference in cumulative costs depends upon how soon the facility actually converts to coal to take advantage of the fuel price differential. The attached graphs depict cumulative costs for both steam and combined cycle facilities when fuel price projections from DOE and the Gas Research Institute are assumed. The graphs show different cumulative cost estimates depending upon the year in which conversion to coal might occur.

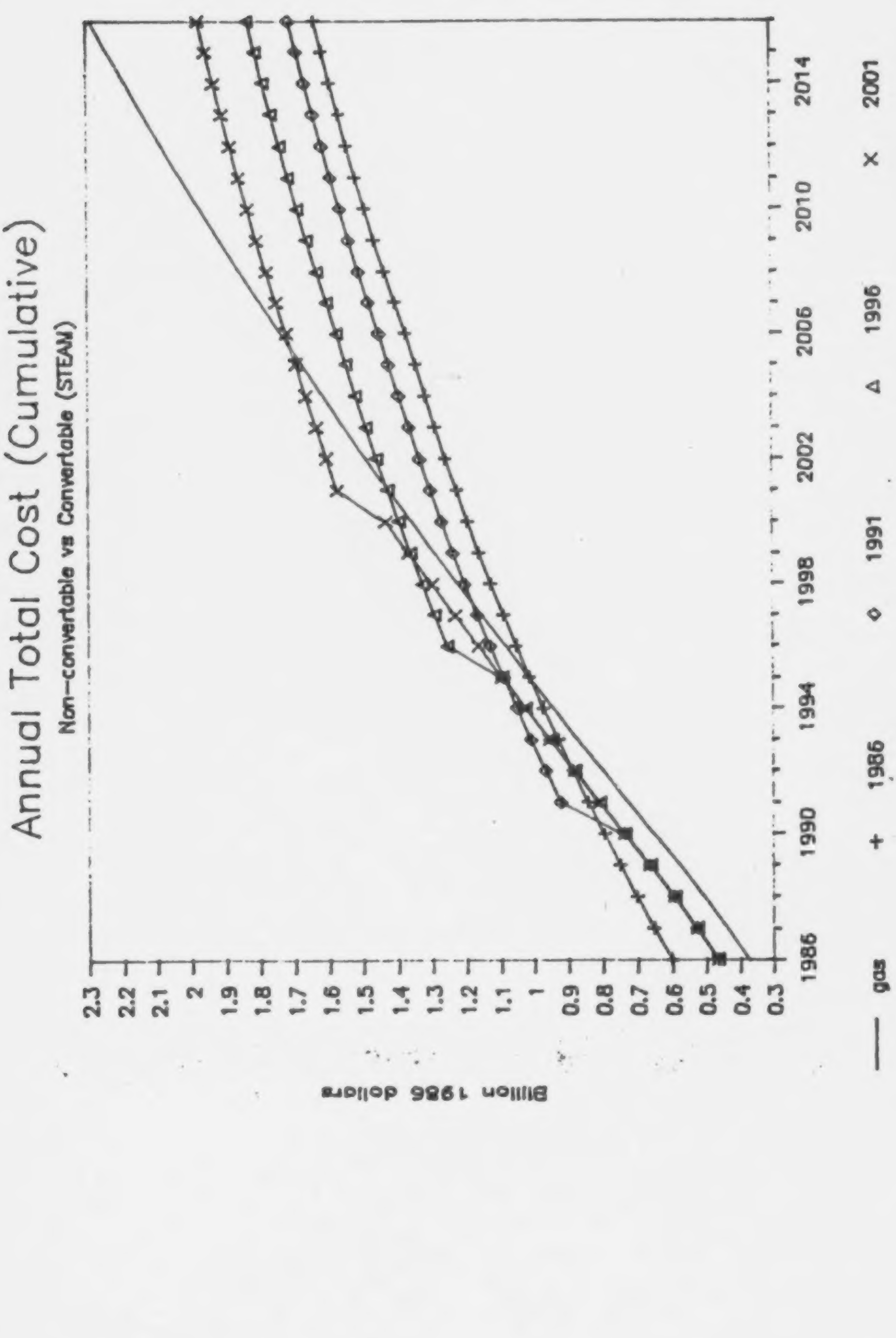
The graphs assume a 500 megawatt steam powerplant and a 500 megawatt combined cycle powerplant with and without a Texaco-type gasification facility.

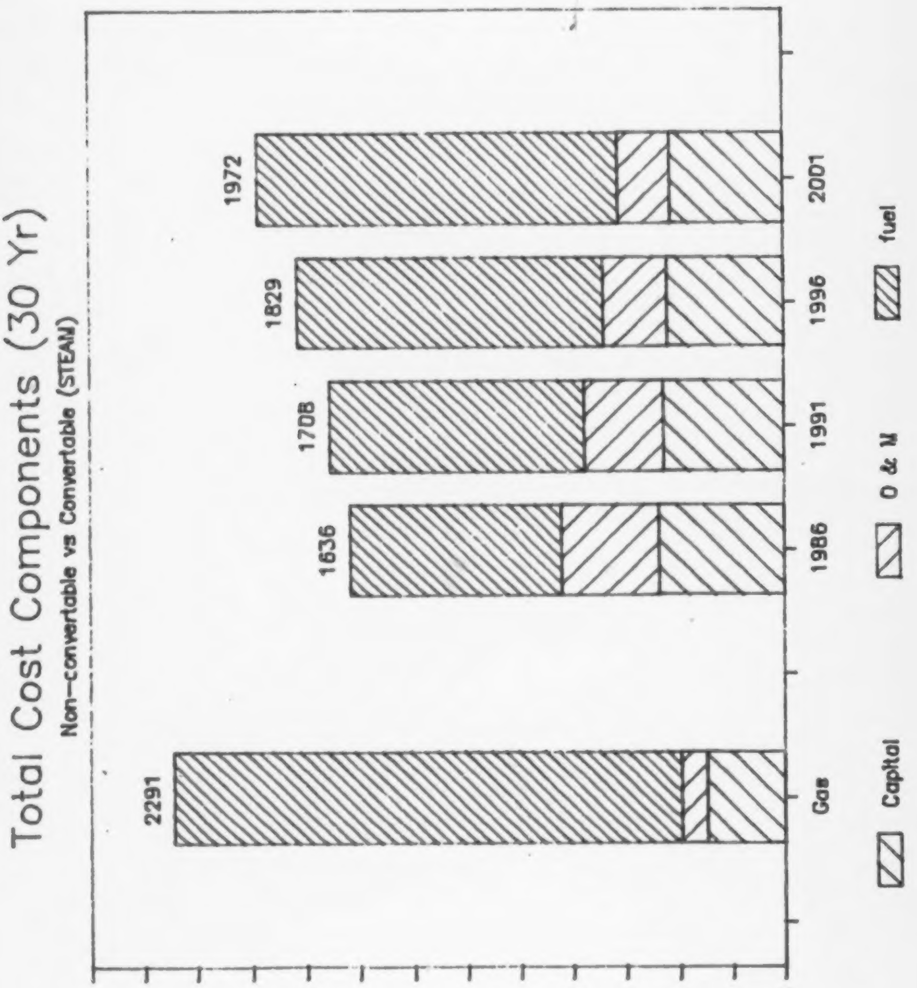
It appears that uncertainty about relative fuel price projections results in a tendency to give more weight to the initial capital cost of a plant rather than total life-cycle costs when choosing technologies. If the projected life-cycle cost of a coal facility is less than the projected life-cycle cost of a non-coal-capable facility, yet utilities still prefer the latter, then it is obvious that initial capital cost considerations weigh heavily in the decision process.

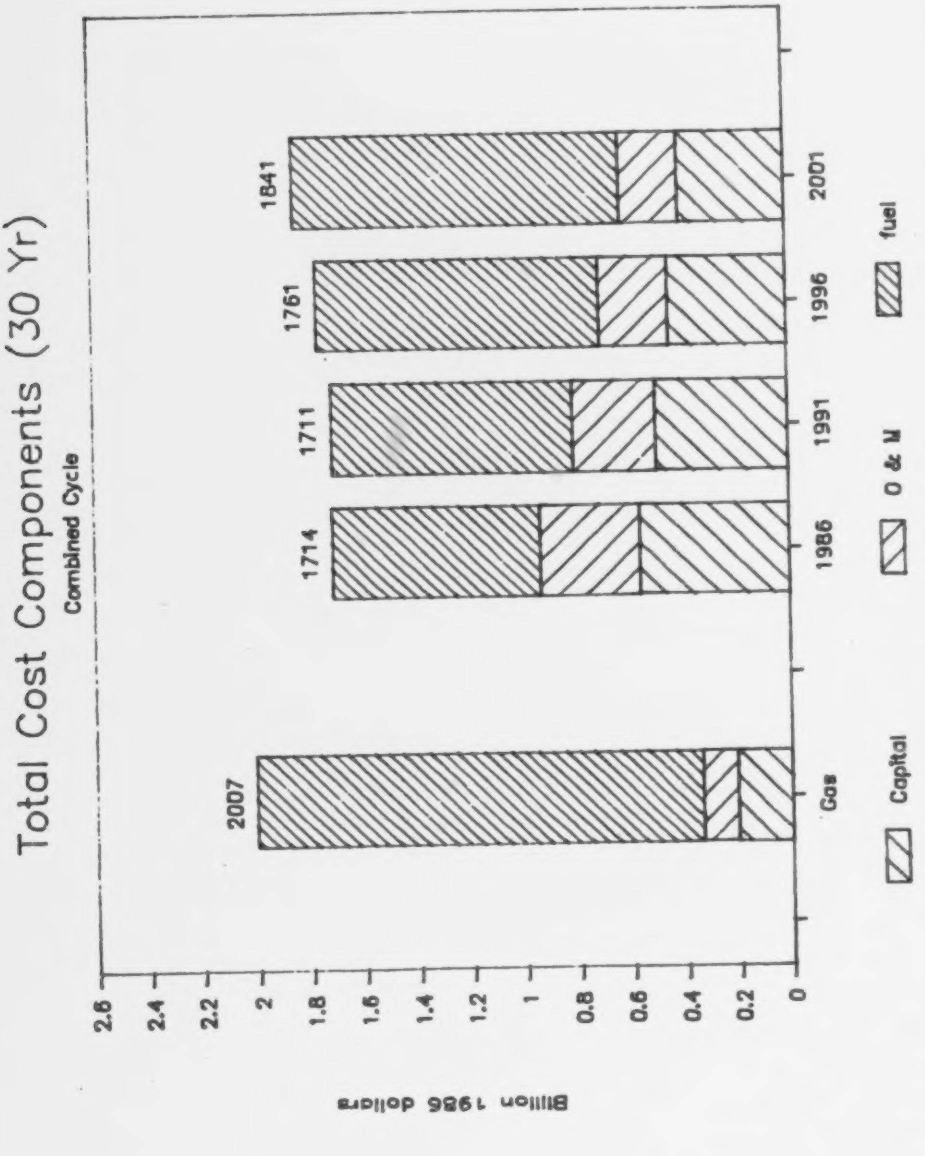
Annual Total Cost (Cumulative)

Non–convertable vs Convertable (STEAM)




Annual Total Cost (Cumulative)
Non-convertable vs Convertable (STEAM)
Billion 1986 dollars
2.3
2.2
2.1
2
1.9
1.8
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
1986
1990
1994
1998
2002
2006
2010
2014
gas
+ 1986
◇ 1991
△ 1996
× 2001


Total Cost Components (30 Yr)
Non-convertable vs Convertable (STEAM)
2291
1636
1708
1829
1972
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
Gas
1986
1991
1996
2001
▨ Capital
▨ O & M
▨ fuel



Total Cost Components (30 Yr)

RESPONSE TO ADDITIONAL QUESTIONS
FROM SENATOR METZENBAUM

QUESTION: A number of panelists stated that gas-fired plants can be brought on line much more quickly than coal-based facilities. Please detail your reasons for agreeing or disagreeing with their assertion.

RESPONSE: A conventional gas fired steam powerplant requires an estimated seven (7) years to design, license, and construct, according to EPRI's Technical Assessment Guide (EPRI P-4463 SR Vol. 1, Dec. 1986). A gas-turbine unit without a waste heat boiler requires a total of three (3) years to design, license, and construct. A combined cycle unit requires four (4) years to install, and a full convention coal-fired powerplant with FGD units (500 MW+) requires nine (9) years to pre-cost, license, design, and construct, according to EPRI.

QUESTION: Panelists disagreed on the question of whether coal-based electrical generating facilities are cost-competitive with gas-fired plants. What are the reasons for this difference of opinion?

RESPONSE: Cost competitiveness depends primarily on comparative fuel price projections. Generally speaking, a conventional coal-fired plant may cost twice as much as a gas turbine or combined cycle powerplant. According to the EPRI data, a conventional coal-fired steam powerplant could cost 50 percent more than a conventional gas or oil-fired steam powerplant. However, differences in fuel costs can offset construction cost advantages over the 30-year useful life of the facility. The current average cost (in cents per million Btus) of coal, oil and natural gas delivered to electric utilities is 154.7¢, 208.6¢ and 214.0¢, respectively (Nov. 1986). However, one year earlier, those ratio's were 164.8¢ 424.4¢ and 343.1¢, respectively. Given such fuel price volatility, cost comparisons can become, as the question implies, a matter of opinion when projected over the life of the plant.

RESPONSES TO ADDITIONAL QUESTIONS
FROM SENATOR FORD

Question (1) Could you please describe what needs to be done to a conventional gas fired turbine to make it capable of using synthetic gas manufactured from coal?

RESPONSE: A gas turbine is the first step of what could become an integrated coal gasification combined cycle (IGCC) unit. After installation of the gas-fired turbine, a waste heat boiler can be added to use the hot exhaust gas (1000 ° F) from the turbine to create steam in a conventional boiler. The resulting steam is then used to power a generator. The combination of the turbine/generator and the waste heat boiler/generator is called a combined cycle unit. A third element is the installation of a coal gasifier which converts coal to a low Btu gas to fire the turbine. The sum of the three parts is an IGCC unit. Only the addition of the gasifier can make a turbine capable of using coal. However, some modifications to the turbine itself are required. These include a larger fuel manifold and fuel nozzles, different combuster baskets and casings, and modifications to the unit controls. Some current turbines are incapable of accepting synthetic gas because of turbine fan design. However, newer turbines, particularly the General Electric Frame 7 model, are capable of being readily adapted to the use of gasified coal.

We therefore believe that "coal capability" for a gas-fired turbine should be defined in such manner that the turbine must be capable of being modified to the use of coal and the space exists for the possible addition of the gasification unit itself.

Question (2) Are the component parts necessary to handle synthetic gas in turbines currently being manufactured? Are they readily available?

RESPONSE: Apparently, the component parts required to adapt a turbine to synthetic gas (see response above) are currently available. At least two IGCC powerplants have been constructed and are in operation or soon to be operating: Texaco's Coolwater facility in California and the Dow Gas facility in Louisiana.

Exhibit B.5-1A

TECHNOLOGY NOS. 1.1 to 1.3

CONVENTIONAL COAL-STEAM WITH WET LIMESTONE FLUE GAS DESULFURIZATION

EAST/WEST CENTRAL REGIONS SUPERCRITICAL, BITUMINOUS COAL

1.1) Two 1000 MW Units
1.2) Two 500 MW Units
1.3) One 500 MW Unit

The conventional supercritical coal-fired power plant cost and performance data presented here are based on a plant with a 3500 psi steam system that has maximum efficiency at full load. Initial steam temperature is 1000°F with a single reheat to 1000°F. The limestone flue gas desulfurization system includes four 33-1/3% capacity modules with bypasses for on-line maintenance.

The characteristics for the representative bituminous coal in the East Central and West Central regions are given in Table B.5-2.

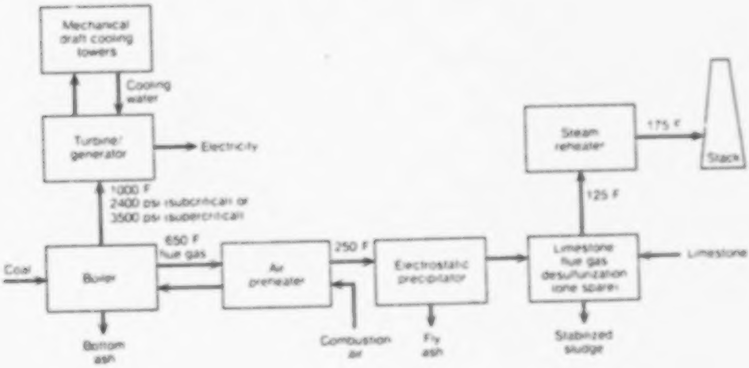

Mechanical draft cooling towers
Cooling water
Turbine/ generator
Electricity
1000 F
2400 psi (subcritical) or
3500 psi (supercritical)
Steam reheater
175 F
Stack
125 F
Coal
Boiler
650 F flue gas
Air preheater
250 F
Electrostatic precipitator
Limestone flue gas desulfurization (one spare)
Limestone
Bottom ash
Combustion air
Fly ash
Stabilized sludge

Exhibit B.5-1B

COAL-STEAM WITH WET LIMESTONE FGD SUPERCRITICAL - BITUMINOUS

Region: East/West Central

Technology Number (a)	1.1	1.2	1.3
Unit Size, MW	1000	500	500
Available for Commercial Orders, Year	1985	1985	1985
First Commercial Service, Year	1985	1985	1985
Plant Capital Cost (b), $/kW based on			
Plant Size of (no. of units x unit size)	2 x 1000	2 x 500	1 x 500
Total Plant Cost, Dec 1984 $ (a)	957	1061	1147
Total Cash Expended (mixed year $)	855	947	1053
AFDC (interest during construction)	226	251	203
Total Plant Investment (includes AFDC)	1081	1198	1256
Startup, Inventory, Land	62	67	69
Total Capital Requirement, Hypothetical Jan 1985 In-Service (includes AFDC)	1143	1265	1325
Operation and Maintenance Costs (b), 1985 Costs in Dec 1984 $			
Fixed, $/kW-yr	17.2	20.1	23.9
Incremental, mills/kWh:			
Variable	1.6	1.9	2.3
Consumables	3.1	3.1	3.1
Net Heat Rate, Btu/kWh			
Full Load	9450	9450	9450
75% Load	9690	9690	9690
50% Load	10300	10300	10300
25% Load	12200	12200	12200
Average Annual	9660	9660	9660
Unit Availability (b)			
Planned Outage Rate, %	10.1	11.5	11.5
Unplanned Outage Rate, %	13.7	12.0	12.0
Equivalent Unplanned Outage Rate, %	21.9	19.5	19.5
Operating Availability, %	77.6	77.9	77.9
Equivalent Availability, %	70.2	71.2	71.2
Average Daily Unavailability, ADU, %	9.5	8.6	8.6
Capability Ratio	1.45	1.31	1.31
Duty Cycle	BASE	BASE	BASE
Minimum Load, %	25	25	25
Preconst, License, & Design Time, Years	4	4	4
Idealized Plant Construction Time, Years	5	5	4
Unit Life, Years	40	40	40
Technology Development Rating	Mature	Mature	Mature
Design & Cost Estimate Rating	Prelim	Prelim	Prelim

(a) See Section B.5.8 for definition of terms.

(b) For mature plant. Estimated cost ranges in Table C-2, Appendix C. Reference Report: EPRI PE-1865 (see Section B.8).

Exhibit B.5-13A

TECHNOLOGY NOS. 14.2 TO 14.6

TEXACO GASIFICATION-COMBINED CYCLE - CURRENT TURBINE

EAST/WEST CENTRAL REGIONS
BITUMINOUS COAL

14.2) One 500 MW Unit, 2000°F Turbine, Radiant & Convective Raw Gas Coolers
14.4) One 250 MW Unit, 2000°F Turbine, Radiant & Convective Raw Gas Coolers
14.6) One 100 MW Unit, 2000°F Turbine, Radiant & Convective Raw Gas Coolers

Pulverized coal in a concentrated water slurry is pumped into an entrained flow gasifier where a partial oxidation process using oxygen produces an intermediate Btu gas (ca. 280 Btu/SCF). After the gas passes through a raw gas cooling section, the sulfur and nitrogen compounds and particulates are removed, and the clean gas is fired in a combustion turbine (at 2000°F). The hot exhaust gases generate steam in heat recovery boilers. The steam is used to drive a steam turbine generator. The sulfur compounds are reduced to elemental sulfur in a Claus plant. The power output is based on an 88°F ambient temperature.

Technology No. 15.2 shown in exhibit B.5-14A is based on a higher-performance combustion turbine with a 2200°F turbine inlet temperature.

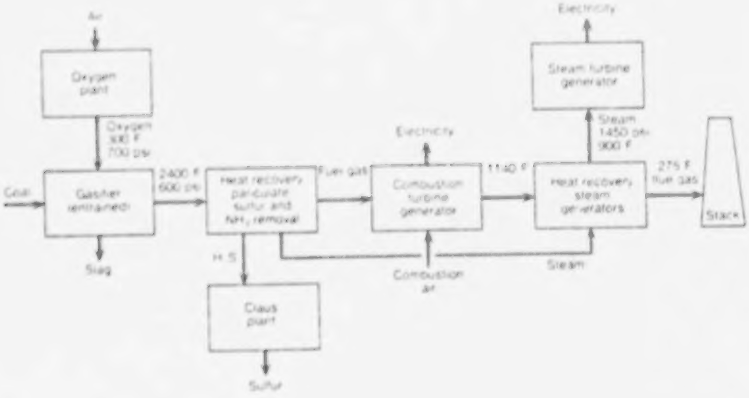

Air
Oxygen plant
Oxygen 300 F 700 psi
Coal
Gasifier (entrained)
Slag
2400 F 600 psi
Heat recovery particulate sulfur and NH3 removal
H2S
Claus plant
Sulfur
Fuel gas
Electricity
Combustion turbine generator
Combustion air
1140 F
Heat recovery steam generators
Steam
Steam 1450 psi 900 F
Steam turbine generator
Electricity
275 F flue gas
Stack

Exhibit B.5-13B

TEXACO GASIFICATION COMBINED CYCLE (CUR TURBINE) RAD&CONV - BITUMINOUS

Region: East/West Central

Technology Number (a)	14.2	14.4	14.6
Unit Size, MW	500	250	100
Available for Commercial Orders, Year	1986	1986	1986
First Commercial Service, Year	1991	1991	1991
Plant Capital Cost (b), $/kW based on			
Plant Size of (no. of units x unit size)	1 x 500	1 x 250	1 x 100
Total Plant Cost, Dec 1984 $ (a)	1411	1686	2291
Total Cash Expended (mixed year $)	1333	1592	2163
AFDC (interest during construction)	166	199	270
Total Plant Investment (includes AFDC)	1499	1791	2433
Startup, Inventory, Land	77	89	120
Total Capital Requirement, Hypothetical Jan 1985 In-Service (includes AFDC)	1576	1880	2553
Operation and Maintenance Costs (b), 1985 Costs in Dec 1984 $			
Fixed, $/kW-yr	31.8	42.6	75.6
Incremental, mills/kWh:			
Variable	3.0	4.0	7.2
Consumables	0.2	0.3	0.4
Net Heat Rate, Btu/kWh			
Full Load	9490	9550	9950
75% Load	9630	9980	10400
50% Load	9980	10650	11100
25% Load	10700	11700	12200
Average Annual	9775	9840	10250
Unit Availability (b)			
Planned Outage Rate, %	3.8	3.8	3.8
Unplanned Outage Rate, %	1.6	2.3	2.3
Equivalent Unplanned Outage Rate, %	13.5	14.0	14.0
Operating Availability, %	94.7	94.0	94.0
Equivalent Availability, %	83.2	82.7	82.7
Average Daily Unavailability, ADU, %	12.2	12.0	12.0
Capability Ratio	1.17	1.17	1.17
Duty Cycle	BASE	BASE	BASE
Minimum Load, %	16	16	16
Preconst, License, & Design Time, Years	4	4	4
Idealized Plant Construction Time, Years	3	3	3
Unit Life, Years	30	30	30
Technology Development Rating	Demo	Demo	Demo
Design & Cost Estimate Rating	Prelim	Prelim	Prelim

(a) See Section B.5.8 for definition of terms.
(b) For mature plant. Estimated cost ranges in Table C-2, Appendix C.
Reference Reports: EPRI AP-3084, AP-3486 (see Section B.8).

Exhibit B.5-25A

TECHNOLOGY NOS. 45.1 AND 45.2

LIQUID/GAS FUEL COMBINED CYCLE - ADVANCED

45.1) One 390 MW Unit, Distillate/Gas Fuel
45.2) One 390 MW Unit, Residual Fuel

Low-sulfur distillate/gas or residual fuel is fired in an advanced combustion turbine/electric generator with a nominal 2200°F turbine inlet temperature. The hot exhaust gases from the turbine pass through a heat recovery steam generator (HRSG) that produces steam for a conventional steam turbine/electric generator. A bypass around the HRSG is included for operating flexibility. The residual fuel plant includes fuel-treating facilities for removing salts and other sediment. The design ambient temperature is 88°F.

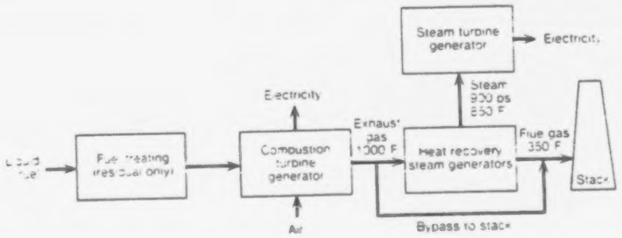

Steam turbine generator
Electricity
Electricity
Steam
900 ps
850 F
Liquid fuel
Fuel treating (residual only)
Combustion turbine generator
Exhaust gas 1000 F
Heat recovery steam generators
Flue gas 350 F
Stack
Air
Bypass to stack

Exhibit B.5-25B

LIQUID/GAS FUEL COMBINED CYCLE - ADVANCED

Region: East/West Central

	DISTILLATE	RESIDUAL
Technology Number (a)	45.1	45.2
Unit Size, MW	390	390
Available for Commercial Orders, Year	1987	1987
First Commercial Service, Year	1989	1989
Plant Capital Cost (b), $/kW based on		
Plant Size of (no. of units x unit size)	1 x 390	1 x 390
Total Plant Cost, Dec 1984 $ (a)	420	500
Total Cash Expended (mixed year $)	408	486
AFDC (interest during construction)	25	29
Total Plant Investment (includes AFDC)	433	515
Startup, Inventory, Land	51	47
Total Capital Requirement, Hypothetical Jan 1985 In-Service (includes AFDC)	484	562
Operation and Maintenance Costs (b), 1985 Costs in Dec 1984 $		
Fixed, $/kW-yr	6.6	8.2
Incremental, mills/kWh:		
Variable	1.5	1.9
Consumables	0.2	0.2
Net Heat Rate, Btu/kWh		
Full Load	7900	8000
75% Load	-	-
50% Load	9650	9750
25% Load	-	-
Average Annual	8140	8250
Unit Availability (b)		
Planned Outage Rate, %	5.0	5.0
Unplanned Outage Rate, %	2.5	2.5
Equivalent Unplanned Outage Rate, %	2.5	2.5
Operating Availability, %	92.6	92.6
Equivalent Availability, %	92.6	92.6
Average Daily Unavailability, ADU, %	0.0	0.0
Capability Ratio	1.03	1.03
Duty Cycle	INTER	INTER
Minimum Load, %	1	1
Preconst, License, & Design Time, Years	2	2
Idealized Plant Construction Time, Years	2	2
Unit Life, Years	30	30
Technology Development Rating	Pilot	Pilot
Design & Cost Estimate Rating	Smplfd	Smplfd

(a) See Section B.5.8 for definition of terms.
(b) For mature plant. Estimated cost ranges in Table C-2, Appendix C.
Reference: In-house estimates.

Exhibit B.5-26A

TECHNOLOGY NOS. 46.1 AND 46.2

LIQUID/GAS FUEL COMBUSTION TURBINE - CONVENTIONAL

46.1) One 75 MW Unit, Distillate/Gas Fuel
46.2) One 75 MW Unit, Residual Fuel

Low-sulfur distillate/gas or residual fuel is fired in a combustion turbine/electric generator with a nominal 1950°F turbine inlet temperature. The residual fuel plant includes fuel-treating facilities for removing salts or other sediment. The design ambient temperature is 88°F.

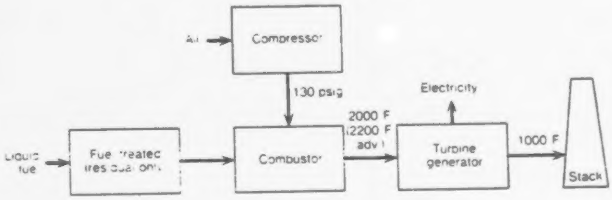

Air
Compressor
130 psig
Electricity
Liquid fuel
Fuel treated (residual only)
Combustor
2000 F
(2200 F adv.)
Turbine generator
1000 F
Stack

Exhibit B.5-26B

LIQUID/GAS FUEL COMBUSTION TURBINE - CONVENTIONAL

Region: East/West Central

	DISTILLATE	RESIDUAL
Technology Number (a)	46.1	46.2
Unit Size, MW	75	75
Available for Commercial Orders, Year	1985	1985
First Commercial Service, Year	1985	1985
Plant Capital Cost (b), $/kW based on		
Plant Size of (no. of units x unit size)	1 x 75	1 x 75
Total Plant Cost, Dec 1984 $ (a)	269	296
Total Cash Expended (mixed year $)	269	296
AFDC (interest during construction)	0	0
Total Plant Investment (includes AFDC)	269	296
Startup, Inventory, Land	26	24
Total Capital Requirement, Hypothetical Jan 1985 In-Service (includes AFDC)	295	320
Operation and Maintenance Costs (b), 1985 Costs in Dec 1984 $		
Fixed, $/kW-yr	0.4	0.5
Incremental, mills/kWh:		
Variable	4.0	4.6
Consumables	0.0	0.0
Net Heat Rate, Btu/kWh		
Full Load	11600	11800
75% Load	12250	12450
50% Load	14050	14300
25% Load	-	-
Average Annual	13800	14000
Unit Availability (b)		
Planned Outage Rate, %	5.0	5.0
Unplanned Outage Rate, %	4.3	4.3
Equivalent Unplanned Outage Rate, %	4.3	4.3
Operating Availability, %	90.9	90.9
Equivalent Availability, %	90.9	90.9
Average Daily Unavailability, ADU, %	0.0	0.0
Capability Ratio	1.05	1.05
Duty Cycle	PEAK	PEAK
Minimum Load, %	1	1
Preconst, License, & Design Time, Years	2	2
Idealized Plant Construction Time, Years	1	1
Unit Life, Years	30	30
Technology Development Rating	Mature	Demo
Design & Cost Estimate Rating	Smplfd	Smplfd

(a) See Section B.5.8 for definition of terms.
(b) For mature plant. Estimated cost ranges in Table C-2, Appendix C.
Reference: In-house estimates.

Exhibit B.5-27A

TECHNOLOGY NOS. 47.1 AND 47.2

LIQUID/GAS FUEL COMBUSTION TURBINE - ADVANCED

ALL REGIONS

47.1) One 130 MW Unit, Distillate/Gas Fuel
47.2) One 130 MW Unit, Residual Fuel

Low-sulfur distillate/gas or residual fuel is fired in an advanced combustion turbine/electric generator with a nominal 2200°F turbine inlet temperature. The residual fuel plant includes fuel-treating facilities for removing salts or other sediment. The design ambient temperature is 88°F.

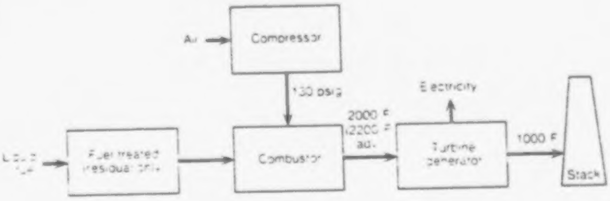

Air
Compressor
130 psig
Liquid fuel
Fuel treated (residual only)
Combustor
2000 F (2200 F ad.)
Electricity
Turbine generator
1000 F
Stack

Exhibit B.5-27B

LIQUID/GAS FUEL COMBUSTION TURBINE - ADVANCED

Region: East/West Central

	DISTILLATE	RESIDUAL
Technology Number (a)	47.1	47.2
Unit Size, MW	130	130
Available for Commercial Orders, Year	1987	1987
First Commercial Service, Year	1989	1989
Plant Capital Cost (b), $/kW based on		
Plant Size of (no. of units x unit size)	1 x 130	1 x 130
Total Plant Cost, Dec 1984 $ (a)	248	274
Total Cash Expended (mixed year $)	248	274
AFDC (interest during construction)	0	0
Total Plant Investment (includes AFDC)	248	274
Startup, Inventory, Land	25	22
Total Capital Requirement, Hypothetical Jan 1985 In-Service (includes AFDC)	273	296
Operation and Maintenance Costs (b), 1985 Costs in Dec 1984 $		
Fixed, $/kW-yr	0.4	0.5
Incremental, mills/kWh:		
Variable	4.0	4.6
Consumables	0.0	0.0
Net Heat Rate, Btu/kWh		
Full Load	11000	11200
75% Load	12900	13100
50% Load	13325	13550
25% Load	-	-
Average Annual	13100	13300
Unit Availability (b)		
Planned Outage Rate, %	5.0	5.0
Unplanned Outage Rate, %	4.3	4.3
Equivalent Unplanned Outage Rate, %	4.3	4.3
Operating Availability, %	90.9	90.9
Equivalent Availability, %	90.9	90.9
Average Daily Unavailability, ADU, %	0.0	0.0
Capability Ratio	1.05	1.05
Duty Cycle	PEAK	PEAK
Minimum Load, %	1	1
Preconst, License, & Design Time, Years	2	2
Idealized Plant Construction Time, Years	1	1
Unit Life, Years	30	30
Technology Development Rating	Pilot	Pilot
Design & Cost Estimate Rating	Goal	Goal

(a) See Section B.5.8 for definition of terms.

(b) For mature plant. Estimated cost ranges in Table C-2, Appendix C.

Reference: In-house estimates.

J. BENNETT JOHNSTON, LOUISIANA, CHAIRMAN

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United States Senate
COMMITTEE ON
ENERGY AND NATURAL RESOURCES
WASHINGTON, DC 20510

March 13, 1987

Mr. Nick Bush
President
Natural Gas Supply Association
1129 20th St., N.W.
Suite 300
Washington, D.C. 20036

Dear Nick:

Enclosed please find additonal questions that have been submitted for the hearing record of the March 12 hearing on S. 85. We would appreciate having your responses no later than a week from today, March 20, so that they will be available to the members prior to the Committee's next Business Meeting on March 25 when S. 85 will be on the agenda.

Thank you for your testimony and we look forward to hearing from you again soon.

Sincerely,

Howard M. Metzenbaum

Howard M. Metzenbaum
Chairman
Subcommittee on Energy Regulation
and Conservation

HMM/bm
Enclosure

QUESTIONS

HEARING ON S. 85

Senator James A. McClure

As I stated in my opening remarks, I do not believe that it is an appropriate role for government to dictate the fuel of choice to be used by electric powerplants and major industrial facilities. However, I do believe that such users should be encouraged to maintain a dual fuel capability in the event of that there are future curtailments of either natural gas or petroleum supplies -- both of which situations occurred in the 1970's.

As the March 11 hearing on the World Oil Outlook highlighted, maintenance of such a dual fuel capability is important when an electric utility intends to rely on imported petroleum supplies.

Although I support repeal of the Fuel Use Act, please answer the following questions:

1. Are not different energy policy questions raised when a utility proposed to use imported oil, rather than natural gas, for new baseload electric power generation?

2. Several of the witnesses observed that baseload electric power generation that relies on coal is cheaper than natural gas or oil fired generation. If that is the case, why would a utility elect to build new, non-coal generating capacity?

3. If a baseload electric power plant were being built today, what are the comparative life expectancies of conventional turbines, compined cycle units, and coal fired generation units?

4. Several of the witnesses have emphasized the advantages of combined cycle electric power generation over conventional gas turbines. Such units are now employed in the Cool Water facility in Southern California which relies on coal derived fuels.

   a. What factors foster the use of combined cycle units over conventional turbines?

   b. What factors will foster an upgrading of combined cycle units so that they can use coal derived fuels?

   c. What circumstances will be required for replication of the Cool Water facility?

5. From an environmental perspective, atmospheric emissions from the combustion of fossil fuels contribute to the so-called "acid rain" and "greenhouse effect"; what are the comparative effects of coal versu. natural gas or oil in these regard?

RESPONSE TO QUESTIONS PROPOUNDED BY SENATOR McCLURE TO MR. NICHOLAS J. BUSH TESTIFYING ON BEHALF OF THE NATURAL GAS SUPPLY ASSOCIATION BEFORE THE SUBCOMMITTEE ON ENERGY REGULATION & CONSERVATION, SENATE COMMITTEE ON ENERGY & NATURAL RESOURCES

(Hearing Date: March 12, 1987; Response Date: March 20, 1987)

QUESTION 1:

"Are not different energy policy questions raised when a utility proposed to use imported oil, rather than natural gas, for new baseload electric power generation?"

RESPONSE:

As we indicated in our written testimony submitted to this Subcommittee on March 12, misguided Federal policies generated a deliverability shortage of natural gas in interstate markets during the 1970's. Although there was tacit Congressional recognition of this fact in the partial deregulation provisions of the NGPA, the maintenance of "old" gas wellhead regulations and passage of the Fuel Use Act and the incremental pricing provisions of the NGPA suggest a Congressional unwillingness to trust market mechanisms which should compel supply and demand for any fuel to reach equilibrium at a competitive price.

Our written testimony refers to (and includes as Appendix B), a study prepared for NGSA by Paul A. London & Associates, Inc. The London study outlines the contribution which natural gas can make to decreasing the U.S. trade deficit and to increasing U.S. energy security. The study found that government regulations cut annual domestic gas production and sales by as much as 2 tcf -- the equivalent of roughly one million barrels of imported oil per day. The study went on to find that deregulation of natural gas combined with open access to interstate pipelines could decrease the U.S. trade deficit attributable to oil import by five billion dollars annually.

Some may argue that the very presence of foreign oil cartels and other obstacles to free markets in energy require that the U.S. government intrude so as to guard against the distortions which such foreign powers may cause. However, past experience teaches that governments

-- domestic or foreign -- are not well suited to the task of controlling energy supplies over the long-term. See e.g., An Analysis of the Department of Energy's Notice of Proposed Rulemaking (NOPR), "Ceiling Prices: Old Gas Pricing Structure," at 6-13 (Service Report, Energy Information Administration, U.S. Dept. of Energy, 1986).

NGSA is concerned by the possible inference suggested in Question 1 to the effect that repeal of the Fuel Use Act end-use constraints might present a national energy security issue which could only be answered by separate treatment for gas and oil-fired baseload electric powerplants. Although NGSA has not conducted a formal analysis in this regard, it is appropriate to note that we are not aware of any domestic utility which proposes to construct a new baseload electric powerplant designed to burn imported oil exclusively.

NGSA believes, and at least one utility representative so testified at the March 12 proceedings, that the difficulty in projecting future fuel prices and fuel availability convinced many utilities to begin construction of multi-fuel capable electric powerplant installations before such action was mandated by Federal law. Since the price and supply shocks of the late

1970's, natural gas and oil producers have experienced increasing elasticity in the powerplant and industrial fuel market due to the fuel choice flexibility which has developed in the industrial and electric powerplant markets since 1978.

NGSA believes that an electric powerplant manager proposing to build a new baseload facility fired solely by imported oil would face a nearly impossible burden in demonstrating the prudence of such a proposal before state public utility commissioners. As Senator Metzenbaum emphasized at the proceedings on March 12, state public utility commissions have become very skeptical of reliance solely on foreign energy imports. Accordingly, it seems unnecessary for Congress to maintain yet another layer of bureaucracy in the form of the Fuel Use Act.

QUESTION 2:

"Several of the witnesses observed that baseload electric power generation that relies on coal is cheaper than natural gas or oil-fired generation. If that is the case, why would a utility elect to build new, non-coal generating capacity?"

RESPONSE:

NGSA did not understand any witness at the hearing on March 12 to make the sweeping statement "that baseload electric power generation that relies on coal is cheaper than natural gas or oil-fired generation." If any such statement was made, it was clearly incorrect.

In our written testimony, at pages 11 - 14, and in Appendix A thereto, NGSA pointed out that incremental additions to baseload electric powerplant capacity through the use of gas-fired combustion turbines and through phased construction of integrated gasified combined cycle plants, allow utility managers to add generating capacity without the long construction lead times and immense capital outlays required for coal or nuclear powerplants.

Gas fired turbines permit utility managers to avoid multi-billion dollar single fuel projects based on uncertain projections of future need. Consumers are better served by such flexibility because unneeded investments are not made and required additional capacity is brought "on line" in stages based on the individual management's judgement of their situation. Thus rate changes occur gradually, rather than all at once at the conclusion of a non-phased project such as a coal-fired baseload powerplant.

NGSA's testimony sets forth the substantial capital cost advantage of gas over coal at prevailing fuel prices. NGSA's testimony is based directly on figures developed by the Electric Power Research Institute (EPRI). Using the EPRI figures, NGSA calculates that at prevailing fuel prices, a 360 megawatt powerplant made fully coal capable and operating at normal capacity factors would cost consumers annually $28 to $34 million more per plant than the less expensive gas fueled option. See also response to Question 3, below. Given these figures, NGSA does not believe that a prudent utility would elect to build the more expensive new, coal-fired electric power generating capacity instead of gas-fired capacity.

QUESTION 3:

"If a baseload electric powerplant were being built today, what are the comparative life expectancies of conventional turbines, combined cycle units, and coal-fired generation units?"

RESPONSE:

Neither NGSA nor its member companies are generally involved in the manufacture of "conventional turbines, combined cycle units, and coal-fired generation units." For this reason, NGSA is not well-suited to the task of determining "comparative life expectancies" of the items referred to in this question.

QUESTION 4:

"Several of the witnesses have emphasized the advantages of combined cycle electric power generation over conventional gas turbines. Such units are now employed in the Cool Water facility in Southern California which relies on coal-derived fuels.

a. What factors foster the use of combined cycle units over conventional turbines?

b. What factors will foster an upgrading of combined cycle units so that they can use coal-derived fuels?

c. What circumstances will be required for replication of the Cool Water facility?"

RESPONSE:

NGSA did not understand "several of the witnesses (to) have emphasized the advantages of combined cycle electric power generation over conventional gas turbines," without further explanation. NGSA believes that we have clearly demonstrated the advantages offered by the relatively simple and inexpensive installation of a gas-fired combustion turbine. Such a configuration is clearly the best choice when current economics are applied to analyzing the benefits of a coal-fired facility versus a gas-fired facility. See responses to Questions 2 and 3, above.

The statement which precedes the sub-questions in Question 4 with regard to "such units" being used in the Cool Water facility is somewhat imprecise. The Cool Water facility represents a demonstration project for coal gasification technology. A combined cycle powerplant can be fired solely by natural gas, or, with the addition of a coal gasifier, a combined cycle power generating facility can utilize coal as a primary fuel source.

The fact that the Cool Water facility utilizes combined cycle technology is important from the standpoint of coal use since the purpose of that project is to demonstrate that coal can contribute to baseload power generation more economically and with lower pollution than conventional coal boilers. Because the combined cycle technology is the most fuel efficient, coal benefits from these efficiencies, as does gas.

However, a strict comparison between a natural gas-fired combined cycle baseload plant and a coal gasified combined cycle plant would unambiguously demonstrate that a natural gas-fired combined cycle baseload powerplant is the most economically sound from the standpoint of prevailing fuel costs, environmental quality, and capital expenditures. See response to Question 5, below.

a. As discussed above, combined cycle technology permits a natural gas-fired combustion turbine to be made more efficient through the addition of waste heat boilers which convert waste heat into steam to drive a turbine to generate additional electrical power. When fired by natural gas, such combined cycle units are exceedingly efficient and economical to operate.

Regardless of whether a combustion turbine is fired by natural gas or by gasified coal, the decision to upgrade a combustion turbine to a combined cycle unit would be based primarily upon a desire to increase the incremental electrical output of the turbine installation while enjoying high fuel efficiencies. We do not believe that any prudent utility manager would propose to install a coal gasified combustion turbine without the use of combined cycle technology due to the efficiency improvements which would otherwise be lost if combined cycle technology is not used.

b. (See response to Question 4.a., above.)

c. The "circumstances" which led to the construction of the Cool Water facility included an interest in demonstrating that the technology exists to burn synthetic fuels derived from coal in efficient combined cycle electrical powerplants. Although the Cool Water plant has demonstrated that coal gasification technology exists, NGSA is aware of only one domestic utility which is currently building a baseload electrical powerplant (in Louisiana) which from the start generally "replicates" the Cool Water facility.

Indeed, much of the debate concerning Fuel Use Act repeal revolves around the issue of whether utilities will be permitted to take advantage of the technology demonstrated by the Cool Water installation by planning phased powerplant configurations which permit immediate needs to be met through inexpensive and rather quickly constructed natural gas combustion turbines to which waste heat boilers may be added at a future time to meet incremental baseload requirements through combined cycle technology, and which permit the addition of a coal gasifier if fuel costs dictate such a course.

In today's and tomorrow's reasonably foreseeable energy markets, there are no circumstances which require or even suggest that utilities should construct fully coal capable facilities using coal gasified technology which initially replicates the Cool Water powerplant. The presence of the end-use constraints on natural gas imposed by the Fuel Use Act make it difficult for utilities to plan phased construction of new baseload electrical powerplants which could eventually take advantage of the technologies demonstrated by the Cool Water plant.

QUESTION 5:

"From an environmental perspective, atmospheric emissions from the combustion of fossil fuels contribute to the so-called 'acid rain' and 'greenhouse effect'; what are the comparative effects of coal versus natural gas or oil in these (sic.) regard."

RESPONSE:

NGSA does not claim any expertise in the scientific aspects of atmospheric emissions or concerning "acid rain" or the "greenhouse effect." For the purpose of responding to this question, NGSA refers this Subcommittee to the statement of Dr. Jessica T. Mathews (Mathews testimony), of the World Resources Institute, presented before the House Subcommittee on Energy & Power on March 11, 1987. Although NGSA has no direct knowledge in this regard, Dr. Mathews apparently participated in the House proceedings as an expert witness on environmental concerns related to the FUA repeal issue pursuant to the invitation of the House Subcommittee.

With regard to the acid rain issue, Dr. Mathews stated the following:

> The difference in the relative emissions of sulfur dioxide from natural gas and other fossil fuels makes natural gas very attractive for responding to acid rain concerns. If existing utility consumption of natural gas -- primarily inefficient peaking turbines -- were replaced with new high efficiency technology, the additional power generated could be

> as much as 26 megawatts. This is enough to displace most of the existing coal capacity in Ohio and Kentucky, or plants responsible for about ten percent of the sulfur emitted by U.S. powerplants. Calculations by Prof. Robert Williams of the Center for Energy and Environmental Studies at Princeton University indicate that new gas power generation may even be competitive with the cost of adding scrubbers to existing coal plants because the efficiency gain results in enormous savings in operating costs.

Mathews testimony, at 2.

Dr. Mathews also addressed the greenhouse effect. Her testimony states in pertinent part:

> Increased use of natural gas also offers important benefits for responding to two other environmental problems of growing concern, the greenhouse effect and ozone depletion. Carbon dioxide from fossil fuel combustion is the single most important source of global warming from the greenhouse effect.
>
> ***

Conventional energy forecasts predict large increases in coal use that imply large increases in CO_2 emissions, atmospheric concentrations, and global temperatures. Forecasts by the World Energy Congress in 1978 and the International Institute for Applied Systems Analysis in 1981 show coal use increasing steadily over three percent per year, a more than five-fold increase by 2025. As a result, atmospheric concentrations of CO_2 are twice pre-industrial levels before 2040.

Some energy sources -- solar, hydro and others -- produce no CO_2, but even among fossil sources, some fuels emit much more carbon dioxide than others for the same amount of energy produced. Natural gas has only about half the CO_2 content of coal and 80 percent of oil. (Citation omitted) From the perspective of the greenhouse problem, then, natural gas is the fossil fuel of choice. Allowing for the more efficient use of natural gas relative to coal, this benefit is still greater.

***

> Coal combustion but not natural gas combustion also releases nitrous oxide, a contributor to the ozone depletion problem.
>
> ***
>
> The Chairman's letter of invitation to this hearing asked whether there are environmental benefits to increased gas use that cannot be matched by new coal burning installations. On the basis of our analysis of the comparative impacts of new coal and gas powerplants on acid rain, greenhouse warming and ozone depletion, the answer is an unequivocal yes. Some of the sulfur reduction achievable with natural gas may also be possible by the introduction of clean coal technologies, although not at costs competitive with natural gas. There is no technical fix for the CO_2 or N_2O effects on greenhouse and ozone depletion. Increased gas use is, therefore, environmentally preferrable.

Mathews testimony at 3-9.

In closing Dr. Mathews stated that "(t)he environmental justification for allowing new uses of natural gas is compelling. The restrictions of the Fuel Use Act are one impediment to this development and should be removed." Id at 12.

These statements are consistent with NGSA's experience concerning the environmental attributes of coal versus natural gas combustion. A copy of Dr. Mathews' entire statement is attached hereto.

WJS:jt

STATEMENT OF

DR. JESSICA T. MATHEWS
WORLD RESOURCES INSTITUTE

BEFORE THE
HOUSE SUBCOMMITTEE ON ENERGY AND POWER

HEARING ON THE
FUEL USE ACT OF 1978

MARCH 11, 1987

My testimony is addressed to the benefits of the proposed repeal of Fuel Use Act restrictions on the use of natural gas in new power plants. We believe that discouraging new uses of natural gas is bad energy policy, economically unsound, and environmentally damaging.

Several natural-gas fired power generation technologies have been developed that offer the benefits of low capital cost, high-efficiency, modular scale, and short installation time. These factors have made gas-fired combined cycle plants increasingly attractive for utility planners. New technologies nearly commercially available, such as inter-cooled steam-injected gas turbines (ISTIG) and regenerative gas turbines, offer the promise of further improving desirable properties in the very near future. I have appended a brief article describing these technologies.[1] As Table I in that article suggests, these technologies are likely to be less expensive than coal or nuclear electricity even with gas costs substantially higher than today's. If Fuel Use Act restrictions are eliminated, utilities will increasingly turn to these technologies to meet future demand without the financial and environmental risk associated with large coal and nuclear plants.

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[1] R. Williams and E. Larson, "Steam-Injected Gas Turbines and Utility Planning", IEEE Technology and Society Magazine, March 1986, pp. 29-38.

Environmental Benefits of Natural Gas Use in Power Generation

The importance of new gas-turbine technologies for electricity planning has received modest attention in recent years. However, the environmental benefits of these technologies are equally noteworthy. The difference in the relative emissions of sulfur dioxide from natural gas and other fossil fuels makes natural gas very attractive for responding to acid rain concerns. If existing utility consumption of natural gas -- primarily inefficient peaking turbines -- were replaced with new high efficiency technology, the additional power generated could be as much as 26 megawatts. This is enough to displace most of the existing coal capacity in Ohio and Kentucky, or plants responsible for about ten percent of the sulphur emitted by U.S. powerplants. Calculations by Professor Robert Williams of the Center for Energy and Environmental Studies at Princeton University indicate that new gas power generation may even be competitive with the cost of adding scrubbers to existing coal plants because the efficiency gain results in enormous savings in operating costs.

Gas technologies are also environmentally and economically preferable as an alternative to new coal plants equipped with scrubbers. A recent American Gas Association analysis illustrates the lower levels of emissions of SO_2 from a currently available natural gas-fired combined cycle plant versus a comparable sized coal steam turbine equipped with an 85 percent effective scrubber system. Table 2. Every 10,000 MW of electricity generated with coal plants equipped with scrubbers will emit 200,000 tons per year more of SO_2 than producing the same power from combined cycle plants.

Natural Gas and the Greenhouse Problem

Increased use of natural gas also offers important benefits for responding to two other environmental problems of growing concern, the greenhouse effect and ozone depletion. Carbon dioxide from fossil fuel combustion is the single most important source of global warming from the greenhouse effect.

The greenhouse problem is now widely recognized as a much more imminent and serious problem than was perceived only a few years ago. Scientists have long known that the combustion of fossil fuels releases carbon dioxide, trapping heat in the atmosphere and gradually warming the earth's surface. The surface of Venus is a vivid demonstration; the temperature is more than 850° F because of the high atmospheric concentration of carbon dioxide.

A variety of gases released by man's activities have greenhouse properties. Some of these, particularly methane and nitrous oxides, are also byproducts of fossil fuel combustion, while others, such as chlorofluorocarbons (CFCs), are not. Together these gases now roughly equal the annual contribution of carbon dioxide, greatly accelerating the onset of global warming. The consensus scientific opinion is that a greenhouse warming of 1.5 to 4.5 degrees centigrade can be expected from a doubling of atmospheric CO_2 above pre-industrial levels. Allowing for growth in emissions of all the greenhouse gases, a commitment equivalent to that which would be caused by a doubling of CO_2 alone could occur as early as the 2030's.

It is vital to understand what these changes could mean. Not since the dawn of civilization some 8,000 years ago has the earth been about $1^{o}C$ warmer than today. To find conditions like those projected for the middle of next century, we must go back millions of years. In short, if the greenhouse effect turns out to be as great as predicted by today's climate models, and if current emission trends continue, our world will soon differ radically from anything in human experience.

While the regional impacts of a global warming are uncertain and difficult to predict, many of the anticipated changes are far-reaching and disturbing. Rainfall and monsoon patterns could shift dramatically, upsetting agricultural activities worldwide. In summer, the Great Plains of the United States, Central Europe, and parts of the Soviet Union could experience Dust Bowl conditions. Sea level could rise from one to four feet, flooding coasts and allowing salt water to intrude into water supplies. Ocean currents could shift, altering the climate of many areas and disrupting fisheries. The ranges of plant and animal species could change regionally, endangering protected areas and many species whose habitats are now few and confined. Record heatwaves and other weather anomalies could harm susceptible people, crops, and forests. As an editorial in the Electric Power Research Institute magazine concluded, "the sweeping consequences of accumulating greenhouse gases may turn out to be the greatest environmental problem of modern times."

Change will be felt long before an effective doubling of CO_2, according to many experts, by the turn of the century. Given the long-lead times involved in changing global energy patterns, it behooves us to examine all means to begin reducing the build-up of greenhouse gases as soon as possible.

Conventional energy forecasts predict large increases in coal use that imply large increases in CO_2 emissions, atmospheric concentrations, and global temperatures. Forecasts by the World Energy Congress in 1978 and the International Institute for Applied Systems Analysis in 1981 show coal use increasing steadily over three percent per year, a more than five-fold increase by 2025. As a result, atmospheric concentrations of CO_2 are twice pre-industrial levels before 2040. Allowing for continued growth in the other greenhouse gases, the onset of significant climate change would in fact be much sooner.

Two recent studies illustrate the potential contribution of natural gas toward moderating the accumulation of carbon dioxide. My colleague, Dr. Irving Mintzer, has developed a model for projecting future emissions of the greenhouse gases that contribute most to global warming. His analysis will be published by WRI in April in a report titled "A Matter of Degrees. The Potential to Limit the Greenhouse Effect". Four scenarios illustrate the potential commitment to global warming associated with different future patterns of energy use. These scenarios are not forecasts but rather representations of plausible global futures reflecting different policy choices. Dr. Mintzer's analysis shows that policies implemented in the near future can significantly affect the rate and extent of global warming due to greenhouse gas build-up. The most important of these policies are greatly increased efficiency in energy use and a shift to carbon-poor or carbon-free fuels.

Some energy sources -- solar, hydro and others -- produce no CO_2, but even among fossil sources, some fuels emit much more carbon dioxide than others for the same amount of energy produced. Natural gas has only about half the CO_2 content of coal and 80 percent of oil. Table 3. From the perspective of the greenhouse problem, then, natural gas is the fossil fuel of choice. Allowing for the more efficient use of natural gas relative to coal, this benefit is still greater.

A comparison of two of Mintzer's scenarios suggests the extent of the possible impact. His "base case" scenario reflects conventional wisdom about population, economic, and energy growth from 1980 to 2075. No policies are introduced to slow the greenhouse gas build-up: no major effort is made to improve energy end-use efficiency, or to introduce non-fossil energy sources. Environmental concerns have little effect on energy policy. Similarly, no policy steps are taken to limit CFC emissions. In contrast, in the "slow build-up" scenario, economic growth is the same, but strong policies are adopted to introduce solar energy, improve energy efficiency, discourage the use of solid fuel, and arrest tropical deforestation. CFC production is frozen by international agreement at the 1985 level. In the base case natural gas provides only about 11 percent of global primary energy in 2025, while the slow build-up scenario, natural gas provides almost twice that percentage.

By 2030, the difference in global warming between these two scenarios is already significant in the model, with a warming commitment in the range of 1.6°C to 4.7°C in the base case scenario and 1.1°C to 3.2°C in the slow build-up scenario. By 2075, the difference is profound -- 2.9°C to 8.6°C in the former and 1.4°C to 4.2°C in the latter.

Another global energy study using very different methodology also illustrates the potential importance of the efficient use of natural gas in avoiding a rapid build-up of carbon dioxide. A team of four experts from different countries, Jose Goldemberg of Brazil, Thomas Johannson of Sweden, Amulya Reddy of India, and Robert Williams of the United States, has analyzed future global energy needs by looking at the amount of energy necessary to satisfy society's demand for goods and services. A summary of this work will be published this spring by the World Resources Institute. Their analysis also highlights the importance of natural gas in a high efficiency future as a strategy for avoiding undesirable build-up of carbon dioxide. Figure 1.

Natural Gas and Ozone Depletion

Coal combustion but not natural gas combustion also releases nitrous oxide, a contributor to the ozone depletion problem. Coal combustion represents on the order of one-third of anthropogenic emissions of nitrous oxide according to recent estimates. Table 4. At current emission rates, the concentration of nitrous oxide will grow by twenty percent by 2030. This would cause a decrease in total ozone between 1.1 and 2.6 percent and a much larger change in the distribution of ozone with altitude, according to the most recent assessment of the World Meteorological Organization. Figure 2.

Ozone depletion is now a major global concern. A Convention for the Protection of the Ozone Layer was signed in 1985 and is the subject of on-going efforts to reach an agreement on regulatory strategies. Each 1 percent decrease in ozone increases damaging ultra-violet radiation almost 2 percent and causes a rise in the incidence of skin cancer by two to five percent. Continued emissions of nitrous oxides at current rates could therefore increase skin cancer by as much 12 percent, adding tens of thousands of additional cases.

The Chairman's letter of invitation to this hearing asked whether there are environmental benefits to increased gas use that cannot be matched by new coal burning installations. On the basis of our analysis of the comparative impacts of new coal and gas power plants on acid rain, greenhouse warming, and ozone depletion, the answer is an unequivocal yes. Some of the sulphur reduction achievable with natural gas may also be possible by the introduction of clean coal technologies, although not at costs competitive with natural gas. There is no technical fix for the CO_2 or N_2O effects on greenhouse and ozone depletion. Increased gas use is therefore environmentally preferable.

Economic Benefits of High-Efficiency Gas Turbines

The technologies that produce these important environmental benefits could produce considerable economic benefits as well. The reduction in electricity costs made possible by matching highly unpredictable capacity additions more closely to need and by lower operating system costs would be a sizable benefit to consumers, helping to keep energy costs low to the economy.

The United States could also benefit economically from the export of high efficiency gas turbines. Numerous developing countries with rapidly growing demand for power, such as Brazil and Pakistan, have relatively large supplies of natural gas. They also expend a large share of their export earnings on imported oil, much of which could be displaced by power generated from natural gas. These countries offer a promising market for low capital cost, high efficiency gas turbines.

The United States holds a competitive advantage in the development of these new technologies because much of the relevant research has been done on jet aircraft engines, a technology that receives about $400 million a year from the Defense Department. We can market the spin-offs of this research to produce a significant civilian benefit. However, while we retain a competitive advantage today, other countries will catch up if we delay. A Japanese consortium is already working with a U.S. firm that holds several relevant patents.

Preserving Gas Supplies and the Fuel Use Act

The Fuel Use Act restrictions on new utility uses of natural gas were enacted out of a concern for the availability of natural gas. Since utility use of gas was in relatively inefficient peaking turbines, it was thought that the limited supply of natural gas believed to be available should be preserved for higher valued uses.

There is now considerable controversy about the long-term supply of natural gas. In the short-term, the problem is a gas glut, but the possibility of new discoveries of gas at reasonable prices is of greater long-term global importance. The resolution of this controversy is, however, unnecessary to justify lifting the restrictions on new utility use of natural gas in high-efficiency technologies. The perverse result of existing law is to allow the continued inefficient use of natural gas in peaking turbines while restricting more efficient uses in new technologies and inhibiting research and development of even more sophisticated ones. As I noted earlier, simply replacing existing utility gas consumption with new high efficiency units would increase electric power production by as much as 26 large

(1000 MW) coal or nuclear plants or alternatively produce the same amount of power with one-third less gas.

These technologies are also compatible with gas produced from coal or biomass sources where gas supplies are limited. Coal-derived gas is likely to be highly undesirable from the standpoint of carbon dioxide emissions, but used in high-efficiency turbines the end result may still be less CO_2 relative to existing coal-fired steam turbines. Biomass fuels are promising in areas with sufficient forests or crop residues to provide fuels on a sustainable basis.

Multi-fuel capability

Much of the debate concerning amending the Fuel Use Act has centered on the desirability of preserving requirements that new natural gas-fired power plants retain the capability to burn coal. While multi-fuel capability is desirable in the abstract for energy security reasons, the actual effect of the law has been counter-productive insofar as new technologies could substantially reduce the gas required to produce a given amount of power.

High-efficiency gas turbines are compatible with coal gasification, but there is little justification for requirements that utilities invest much now to prepare for the addition of such systems in the future. Very little natural gas is likely to be imported at any time in the foreseeable future and the added cost is therefore unlikely to offer much additional protection to our energy security.

Conclusion

The environmental justification for allowing new uses of natural gas is compelling. The restrictions in the Fuel Use Act are one impediment to this development and should be removed. This legislation offers a rare opportunity to improve our environment, our energy policy, and our economy simultaneously.

Table 1

COMPARISON OF ESTIMATED REGIONAL BUSBAR ELECTRICITY COSTS FROM NUCLEAR, COAL, AND ISTIG CENTRAL STATION POWER PLANTS

Region	1985 cents/kWh (a,b)				Year in which a switch is made to gas derived from coal, ISTIG B	Natural gas prices assumed for 1990, in 1985$/MBTU ($/GJ) (c)	
	Nuclear	Coal	ISTIG A	ISTIG B			
New England	5.5	6.0	5.5	5.1	2001	4.31	(4.09)
Middle Atlantic	5.8	5.7	5.2	4.9	2003	4.03	(3.82)
E. North Central	5.6	5.5	5.5	5.1	2001	4.38	(4.15)
W. North Central	5.5	5.5	4.4	4.3	2012	3.15	(2.99)
South Atlantic	5.4	5.3	4.4	4.3	2012	3.15	(2.99)
E. South Central	5.2	5.7	4.5	4.5	2007	3.42	(3.24)
W. South Central	5.2	3.8	4.7	4.7	2007	3.63	(3.44)
Mountain	5.5	4.0	4.7	4.7	2006	3.68	(3.49)
Pacific	5.8	6.0	6.0	5.4	1997	4.91	(4.65) (d)
U.S. Average			5.1	4.9	2004	3.94	(3.73)

(a) Nuclear and coal busbar electricity costs are estimates by the U.S. Department of Energy for plants entering service in 1995 [42], converted to 1985$ using the GNP deflator.

(b) The ISTIG scenarios are for a 110 MW ISTIG plant @ 48 percent efficiency entering service in 1990, assuming (following [20]) an installed capital cost of $500/kW, a fixed O&M cost of $10.00/kW/yr, and a variable O&M cost of 0.4 cents/kWh. For Scenario A it is assumed that the plant always operates on natural gas, the price of which is assumed to escalate in real terms at an annual average rate of three percent per year over the life of the facility. For Scenario B it is assumed that the plant switches from natural gas to gas derived from coal when the natural gas price reaches six dollars per million BTU, the assumed price of coal gas. In both cases a 10 percent discount rate, a 30 year plant life, and a 75 percent capacity factor are assumed.

(c) From [35].

(d) The higher projected gas price in the Pacific region is probably to some extent an artifact of regulatory practices and the structure of some of the large utilities in this region. For example, as of August 1985 at the Pacific Gas and Electric Company in California, the actual gas acquisition cost incurred by the gas division was about $3.90/MBTU, while the price charged to the electric division was about $4.40/MBTU (Robert Weatherwax, Sierra Energy and Risk Assessment, Sacramento, CA, personal communication, November 1985).

Source: Robert H. Williams and Eric D. Larson
"Steam-Injected Gas Turbines and Electric Utility Planning"
IEEE Technology and Society Magazine, March 1986

Table 2

ENVIRONMENTAL COMPARISON OF NATURAL GAS-FIRED COMBINED CYCLE
GENERATING STATION AND COAL-FIRED STATION
(Annual Impacts, 240 Megawatts)

	Coal-Fired Steam Plant	Gas-Fired Combined Cycle
Air Pollutant Emissions (tons/yr.)		
Sulfur Dioxide	4,123	3
Particulate Matter	206	9
Nitrogen Oxides	2,385	1,352
Other Pollutant Emissions (thousands of tons/year)		
Sludge	168	none
Ash	60	none
Treated Water Consumption (millions of gallons/year)	30	15

Source: Michael German, American Gas Association
Natural Gas for Efficient Electric Generation - 12/10/86

Table 3

CO2 EMISSIONS FROM FOSSIL FUEL USE
(Millions of Tons of carbon per Exejoule)

	Extraction & Production	Combustion	Total Emissions
Conventional Gas		13.8	13.8
Conventional Oil		19.7	19.7
Coal		26.9	26.9
Synthetic Oil	18.9	19.7	38.6
Synthetic Gas	26.9	13.8	40.7
Shale Gas	27.9	19.7	47.6

Source: Irving Mintzer, "A Matter of Degrees: The Potential for Limiting the Greenhouse Effect", World Resource Institute, April 1986

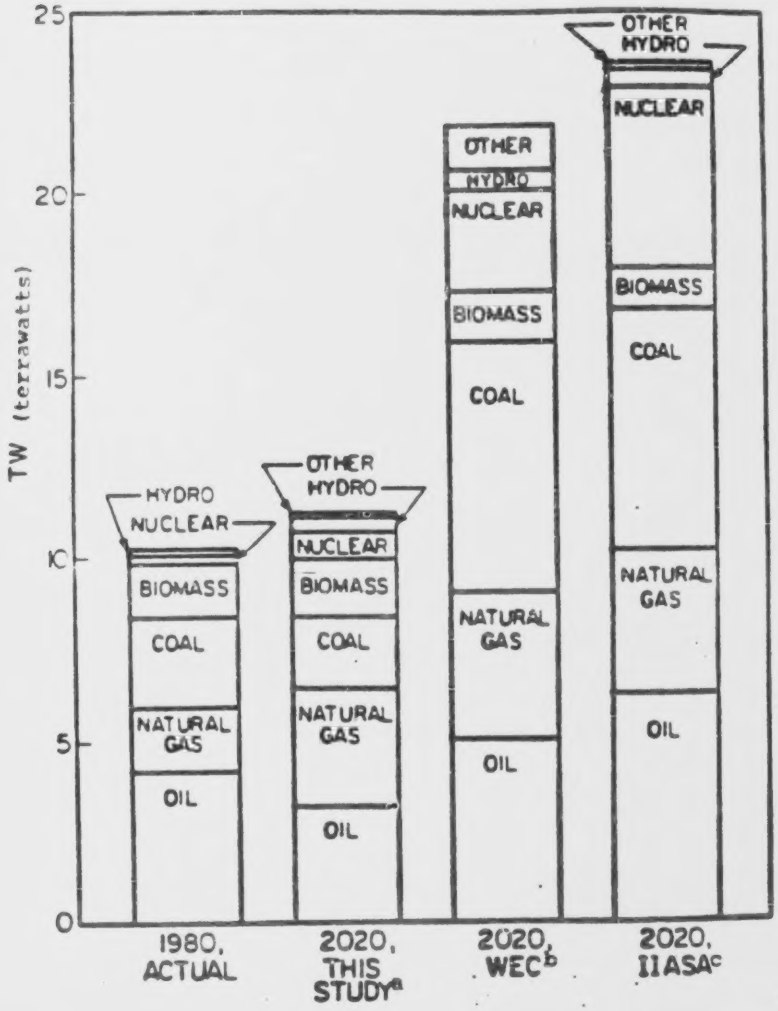
Table 4

Nitrous Oxide Sources and Sinks (1984 concentration 303 ppb)

A	*Atmospheric burden* (10^6 tons as N)	1500
B	*Sinks + accumulation* (10^6 tons N yr^{-1})	
	stratospheric photolysis + reaction with $O(^1D)$	10.5 ± 3
	accumulation (0.7 ppb yr^{-1})	3.5 ± 0.5
	total	14.0 ± 3.5
C	*Sources* (10^6 tons N yr^{-1})	
	oceans	2 ± 1
	combustion coal + oil, 4 ± 1	
	biomass 0.7 ± 0.2	4.7 ± 1.2
	fertilized agricultural lands	0.8 ± 0.4
	grasslands	< 0.1
	– boreal and temperate forests	0.1 – 0.5
	tropical and subtropical forests and woodlands (extrapolation of soil data)	7.4 ± 4
	total	15.3 ± 6.7
D	*Tropical Contribution* (10^6 tons N yr^{-1})	
	biomass burning	0.6
	soil emissions	7.4
	total	8.0

Source: M McElroy and S. Wofsy, "Tropical forests: Interactions with the Atmosphere", in Symposium vol. on Tropical forests and World Atmospheres, edited by G. Prance in press, 1985

Figure 1. A comparison of the total energy use and fuel mix for three energy scenarios in 2020



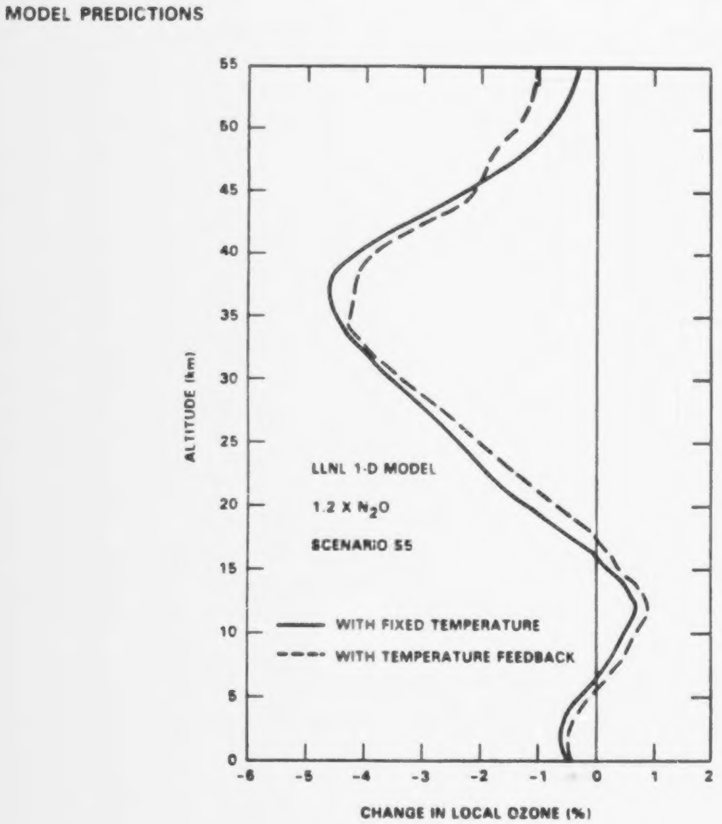
a. J. Goldemberg, T. Johansson, A. Reddy, R. Williams, "An End-Use Oriented Global Energy Strategy," Annual Review of Energy Vol. 10, p.. 613-88 (1985)

b. World Energy Conference 1983 forecast

c. International Institute for Applied Systems Analysis, Energy in a Finite World -- A Global Systems Analysis (Cambridge, Mass: Ballinger, 1981).

Figure 2

Calculated Percentage Change in Local Ozone
for 20% Increase in Nitrous Oxide



Source: World Meteorological Organization, Atmospheric Ozone, Vol. 3, 1985

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United States Senate
COMMITTEE ON
ENERGY AND NATURAL RESOURCES
WASHINGTON, DC 20510

March 13, 1987

Mr. George Lawrence
President
American Gas Association
1515 Wilson Blvd.
Arlington, VA 22209

Dear Bud:

Enclosed please find additonal questions that have been submitted for the hearing record of the March 12 hearing on S. 85. We would appreciate having your responses no later than a week from today, March 20, so that they will be available to the members prior to the Committee's next Business Meeting on March 25 when S. 85 will be on the agenda.

Thank you for your testimony and we look forward to hearing from you again soon.

Sincerely,

Howard M. Metzenbaum

Howard M. Metzenbaum
Chairman
Subcommittee on Energy Regulation
and Conservation

HMM/bm
Enclosure

ADDITIONAL QUESTIONS FROM SENATOR JOHNSTON

QUESTIONS FOR BUD LAWRENCE (AGA)

1. Your statement talks about the advantages of using natural gas in new, high efficiency applications. How much efficiency do you lose in a baseload powerplant by making the boiler "coal convertible" instead of installing a conventional gas-fired boiler?

2. Some have suggested that all powerplant supplies should be subject to curtailment priorities. That would mean extending the current system of curtailment priorities to transportation gas, as well as to pipelines' system supplies. Could you please give us your views on this idea?

ADDITIONAL QUESTIONS FROM SENATOR FORD

QUESTION FOR BUD LAWRENCE (AGA)

We touched on the question of making transportation gas subject to curtailment. It was pointed out that a significant percentage of the gas transported by pipelines for others is "interruptible" and thus would be cut off if supplies were short.

a. Who determines when the interruptible gas is, in fact, interrupted?

b. If the gas is interrupted, who determines what other customers get that gas?

c. Does the Federal Energy Regulatory Commission have any authority to determine what customers or what priority of customers get that gas if the transportation is interrupted?

ADDITIONAL QUESTIONS FROM SENATOR METZENBAUM

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Please provide the Subcommittee with details on the amount of gas demand by the highest priority users on each system represented in AGA's membership, and the amount of gas subject to FERC curtailment authority carried on each of those systems.

ADDITIONAL QUESTIONS FROM SENATOR METZENBAUM

QUESTION FOR AMERICAN PUBLIC POWER ASSOCIATION, EDISON ELECTRIC INSTITUTE, NATIONAL COAL ASSOCIATION, AND APPLIED ENERGY SERVICES

A number of panelists stated that gas-fired plants can be brought on line much more quickly than coal-based facilities. Please detail your reasons for agreeing or disagreeing with their assertion.

AMERICAN GAS ASSOCIATION RESPONSES TO QUESTIONS FROM SUBCOMMITTEE ON ENERGY REGULATION AND CONSERVATION
Hearing Record of
March 12, 1987

ADDITIONAL QUESTIONS FROM SENATOR JOHNSTON

1. QUESTION: Your statement talks about the advantages of using natural gas in new, high efficiency applications. How much efficiency do you lose in a baseload powerplant by making the boiler "coal convertible" instead of installing a conventional gas-fired boiler?

RESPONSE: Boilers designed to fire natural gas only can be designed with minimal spacing between the tubing. This is not true for coal boilers which require greater spacing due to the accumulation of slag in coal boilers. Oversizing a gas boiler to accommodate coal would result in a 3 to 5 percent efficiency penalty when burning -- i.e., 3 to 5 percent more gas would be required than for a gas only boiler of equal output. (See Feasibility and Cost of Converting Oil-and Coal-Fired Utility Boilers to Intermittent Use of Natural Gas, Massachusetts Institute of Technology.)

Gas-fired combined cycle units would be about 20 percent more efficient when operating on high Btu natural gas than medium Btu coal gas. However, little or no efficiency penalty would be suffered by making a gas-fired combined cycle unit "coal convertible" since this would entail no major equipment modification.

2. QUESTION: Some have suggested that all powerplant supplies should be subject to curtailment priorities. That would mean extending the current system of curtailment priorities to transportation gas, as well as to pipelines' system supplies. Could you please give us your views on this idea?

RESPONSE: A.G.A. would oppose such a proposal. This kind of new policy is clearly unnecessary, since it would address a most unlikely set of circumstances. In addition, such a policy would actually do some harm, by helping to perpetuate the marketplace misimpression that the Federal Government still views gas supplies as unstable (or at least potentially so).

We cannot stress strongly enough the great improbability of a gas supply shortage in the future. Lower 48 proven gas reserves quickly stabilized once Congress made the decision to initiate phased decontrol of natural gas at the wellhead;

lower 48 reserve additions have been running at or near the replacement rate ever since. Further, behind these proven reserves we find a large resource base of currently undiscovered gas in the lower 48 states. Credible estimates, by the highly respected experts on the Potential Gas Committee, indicate that undiscovered gas, when added to proven reserves of 163 trillion cubic feet, equals a resource base of over 800 trillion cubic feet for conventional lower 48 gas alone. This is enough gas to meet current demand for more than 50 years--without even counting Alaskan gas, Canadian gas, Mexican gas, or potentially vast unconventional gas resources (such as Devonian shale gas and geopressured methane). With such a large domestic natural gas resource base, and with no wellhead price controls to hinder the response of that resource base to market forces, it can be safely assumed that any tightening of gas supplies will trigger higher wellhead prices which will in turn trigger enough new supplies to avert any shortage.

If for some reason the unthinkable should happen, high priority gas consumers are still shielded by numerous protective factors in the status quo:

a. Most gas-using powerplants (including new combined cycle powerplants) would be able to shift to another fuel if gas supplies grew short. FUA exemption petitions filed at DOE show that new powerplants are almost always designed to be "dual capable", although the backup fuel might be distillate oil or propane or some other energy source besides coal.

b. Section 401(a) of the Natural Gas Policy Act requires that, in a supply shortage situation, homeowners, tenants and other high priority gas consumers must have an absolute "first claim" on all pipeline system gas supplies. For this protection to be eroded, total gas supplies would have to be inadequate and pipelines would have to be faring poorly in the competition with direct purchasers for an adequate share of these inadequate supplies. There is no reason to assume that pipeline purchasers would be outmaneuvered at the wellhead by relatively inexperienced direct purchasers.

c. High priority gas consumers would also enjoy the protection of direct purchases that their local distribution companies have made. A clear trend of recent years has been a tendency for gas distributors to participate at the wellhead on a large and expanding scale.

When all of the above factors are considered, it is exceedingly improbable that homeowners and other high priority consumers would ever need access to directly purchased powerplant gas supplies. However, if such an unlikely event should ever occur, high priority gas consumers would still be protected by Section 303(d) of the Natural Gas Policy Act. Under this provision of statutory law, "user-owned gas" may be re-allocated to high priority gas consumers--as a last resort--if normally applicable curtailment priorities have failed to adequately protect such customers.

To conclude where we began, the contemplated new policy would not be necessary. It would only serve to discourage gas demand by perpetuating the myth that domestic natural gas is a scarce resource.

ADDITIONAL QUESTIONS FROM SENATOR FORD

3. QUESTION: We touched on the question of making natural gas subject to curtailment. It was pointed out that a significant percentage of the gas transported by pipelines for others is "interruptible" and thus would be cut off if supplies were short.

a. Who determines when the interruptible gas is, in fact, interrupted?

b. If the gas is interrupted, who determines what other customers get that gas?

c. Does the Federal Energy Regulatory Commission have any authority to determine what customers or what priority of customers get that gas if the transportation is interrupted?

RESPONSE: Frankly, this question is difficult to address because it appears to mix together gas that is transported by interstate pipelines with gas that is sold by interstate pipelines. In the process, it seems to mix together regulatory policies for allocation of overbooked pipeline capacity with regulatory policies for curtailments aimed at allocating inadequate pipeline supplies.

Under present Federal policies, the capacity allocation regulations do not dovetail precisely with the supply allocation regulations. Consequently, in our response we will disentangle the two sets of policies as best we can.

For both capacity shortfalls and supply shortfalls, the pipeline makes the determination as to when--and to what extent--service must be disrupted or diminished. In taking this action, however, the pipeline must follow certain "rules" that guide its service cutback behavior. The basic rules are set forth in the pipeline's individual contractual agreements. Particularly important in the realm of contractual guidelines is the question of whether a given customer has been willing to pay a premium in order to have "firm" service rather than "interruptible" service. For the "interruptible" customer, a supplier can normally disrupt service--for cause--without running the risk of a contractual penalty or other liability. For his part, the "interruptible" customer typically expects to be cut off during periods of peak demand, has a backup fuel or some other option for handling periods of service disruption, and usually gains substantial savings in return for the higher risks of service disruption.

Although contractual guidelines--and especially the distinctions between "firm" and "interruptible" service--serve as the starting point for pipeline actions, these contractual provisions are not absolute. Instead, the contractual provisions are subordinate to, and even shaped by, overriding policies of the Federal Government.

The clearest examples of such a Federal override can be found in Sections 401 and 402 of the Natural Gas Policy Act. Section 401(a) states that, in the case of supply curtailments, residential customers--and other high priority gas consumers--have an absolute "first claim" on supplies. Period. FERC has interpreted this to mean that distinctions between "firm" and "interruptible" service apply only within that class of customers. For example, a school system on "interruptible" service can be curtailed only if the gas supplies are needed by other high priority customers that have "firm" contracts; the "interruptible" school system will have a higher curtailment priority than a "firm" factory or powerplant.

Section 401 of the Natural Gas Policy Act goes on to place "essential agricultural uses" in the second tier of priority, just below the high priority customer class, while Section 402 establishes "essential industrial process and feedstock uses" as the third tier. Both of these tiers have absolute priority over the tiers which rank below them. The end result is that this statutory language, while appearing to create three top tiers for supply curtailments, functionally creates six: "firm" high priority customers, "interruptible" high priority customers, "firm" essential agricultural uses, "interruptible" high priority uses, "firm" essential industrial process and feedstock uses, and "interruptible" essential industrial process and feedstock uses.

Below these six tiers, which address only supply curtailments, statutory directives are absent (except for certain emergency gas supply allocation authority that is granted to the Federal Government in Sections 301, 302, 303 and 304 of the Natural Gas Policy Act). In place of statutory directives, there is statutory discretion--for FERC to fashion its own policies.

In those areas where FERC has discretion over supply allocation, FERC has usually permitted each pipeline to develop its own standby curtailment plan. Each such plan reflects broad Commission guidance, has been developed by the pipeline in concert with its customers, and is binding on the pipeline. In general, the pipeline curtailment plans are more sensitive than the statutory priorities to the distinction between "firm" and "interruptible" customers. That is, where statutory law does not require otherwise, some "firm" customers outrank other "firm" customers (usually based on the assumed social value of the particular gas use involved and/or the presence or lack of a backup fuel capability), but all "firm" customers typically outrank all "interruptible" customers.

The regulatory schematic is even simpler when one moves from questions of pipeline supply allocation to questions of pipeline capacity allocation. FERC's capacity allocation policies are much more recent (dating largely to the Commission's deliberations in FERC Order 436) and have been less influenced by statutory mandates. A.G.A. notes that the Order 436 details are still being worked out on a system-by-system basis (and even a contract-by-contract basis). In general, however, the "bottom line" seems to be the emergence of a straightforward classification system: That is, there are "firm" pipeline customers and there are "interruptible" pipeline customers. Period.

If A.G.A. is interpreting some of the freshly minted Order 436 policies correctly, FERC policies would generally require interstate pipelines to respond to a capacity shortfall by shedding all interruptible load--including "interruptible" sales load as well as "interruptible" carriage load. (It is still not clear how "interruptible" customers would be prioritized--within the "interruptible" class--if conditions do not require all "interruptible" load to be shed, but it is clear that sales and carriage would be treated identically.) In the event that the shedding of all "interruptible" sales and carriage service still did not free up enough capacity to meet all of the remaining demand for capacity, then the pipeline would begin to disrupt service to selected "firm" sales customers and selected "firm" carriage customers. This selection would be based on the priorities set forth in that pipeline's existing plan for handling supply curtailments. Further, the service disruption would apply equally to all "firm" customers in the lowest-ranking customer classes, regardless of whether those customers had "firm" carriage service or "firm" sales service.

We trust that this detailed outline of the current allocation systems--for handling both supply shortfalls and capacity shortfalls--will be helpful to the Subcommittee. As our response to the final part of the Subcommittee's question, we stress that FERC has very broad discretion to change the current allocation systems if it chooses. In the case of capacity allocation, FERC's clear jurisdiction over virtually all interstate pipeline operations--coupled with the apparent absence of any statutory specifications--gives FERC a very free hand. In the case of supply allocation, FERC can address pipeline-owned supplies in virtually any manner that is not inconsistent with the directives in Sections 401 and 402 of the Natural Gas Policy Act. As for user-owned gas supplies, Section 303(d) of the Natural Gas Policy Act provides that FERC--or any other party so authorized by the President--can re-allocate such supplies during certain specified gas supply emergency conditions.

ADDITIONAL QUESTIONS FROM SENATOR METZENBAUM

4. QUESTION: Please provide the Subcommittee with details on the amount of gas demand by the highest priority users on each system represented by AGA's membership, and the amount of gas subject to FERC curtailment authority carried on each of these systems.

RESPONSE: We do not have this type of information at A.G.A. However, we have provided an aggregate estimate for 1985 for the major interstate pipelines (latest data available). We stress that the amount of gas subject to FERC curtailment will vary by pipeline.

Total 1985 Interstate Pipeline Sales = 11.3 Tcf

"High Priority" Interstate Sales (estimated by subtracting utility sales in producing states assumed to be intrastate supply).

Residential	3.9 Tcf
Firm Commercial	1.9
Firm Industrial	1.5
TOTAL	7.3 Tcf

So as much as 7.3 Tcf of 1985 interstate sales could be considered "high priority". EIA data show that as of year-end 1985, interstate pipelines had 85.1 Tcf of domestic reserves and 10 Tcf of Canadian reserves under contract -- adequate to supply high priority customers for more than a decade without any additional reserves.

Sources: A.G.A. Gas Facts 1985
EIA, Natural Gas Monthly, December 1986
EIA, Gas Supplies of Interstate Natural Gas Pipeline Companies, 1985.

Additional Information for the Subcommittee

The Fuel Use Act currently prohibits electric utilities from constructing new gas-fired combined cycle units with input capacities over 100 MMBtu/hour. Yet, the choice of gas-fueled combined-cycle power can save energy. In 1986, nearly 1.5 quads of oil was used to generate electricity. Oil-fired electric generation has an efficiency of 30%. If all the oil-fired electric generating capacity were to convert to gas-fired combined cycle, with an efficiency of about 45%, then about 0.5 quads of energy could be saved.

Similar savings could come from replacing existing natural gas-fired electric generation units with combined-cycle. In 1986, 2.7 quads of natural gas were used to generate electricity. The average efficiency of a natural gas unit is 32%, compared to a combined cycle gas unit with a 45% efficiency. If all gas-fired capacity was replaced with combined cycle, the efficiency gain would provide 0.8 quads of energy savings.

In both of these instances, the savings would not come at the expense of coal. It should also be noted that requiring coal capability for these existing sites could preclude conversion to gas-fired combined cycle units. In order for a combined cycle unit to be coal capable, it needs space for the coal gasifier. Many existing gas and oil facilities are located in congested, urban areas where additional land may not be available. If required to be coal capable, the unit could not convert and there would be no efficiency gains.

Natural Gas and Coal "Reserves"

Recent discussions about the adequacy of natural gas supplies have focused on comparisons of the resource base for gas versus other fossil fuels, namely coal. Unfortunately, these discussions are often confused by the major definitional differences which exist between the classification of coal resources and the classification of gas resources. A recent study by the Institute for Energy Resource Studies of the Colorado School of Mines[1] discusses the resource classification systems for a number of nonrenewable mineral deposits.

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[1] A Discussion of Resources and Reserve Definitions for Petroleum, Natural Gas, Coal, Oil Shale, Uranium and Ore Deposits, Institute for Energy Resource Studies, Colorado School of Mines, March, 1987.

There are major differences in the way coal and natural gas reserves and resources are calculated and defined. From the Colorado School of Mines study it is apparent that the existing systems are inconsistent in their approach to the classification of different mineral resources. The study describes some of the definitional differences between classifications for coal resources and classifications for gas and oil resources.

The term proved reserves is most commonly applied for those natural gas resources which have been confirmed to exist (as a result of drilling) and are currently producible under contemporary technical and economic conditions. In the jargon of coal only the term identified, economic coal reserves, would be comparable. The usual references to the "coal resource base" describe a quantity of coal in place but does not address the amount of that coal which can be economically recovered. Thus, estimates of "the coal reserve base" include hydrocarbons which when compared to natural gas is more like the "gas-in-place" (which also includes subeconomic resources) than it is like "proved reserves" (which is limited to economically recoverable reserves). As a result, for long range energy planning issues, there is no certainty regarding the true relative sizes of the resource of natural gas as compared to coal.

There is no doubt that the natural gas resources are formidable. The DOE Report to the President entitled Energy Security (March 1987) cited the 200 years of gas available for future consumption at current rates. As shown in Table 1, if only conventional and unconventional gas resources (only unconventional gas categories that are today in commercial production) are considered, then there is 280 years of gas to be exploited. In this type of assessment no allowance is made for gas at depths of greater than 30,000 feet (although wells have been drilled to greater depths) or offshore resources at water depths of more than 1,000 meters (although offshore drilling has occurred in U.S. waters of twice that depth). Hence, the full impact of probable technological achievement is not recognized in the 280 years gas estimate. It is reasonable to expect that this estimate will increase as new technology develops, allowing economic drilling in deeper waters and at greater depths.

Unfortunately, the focus of recent discussions as to the adequacy of fossil fuel resources has moved away from an obvious point -- that resources of both natural gas and coal are sufficiently large that fuel use decisions should not focus on the adequacy of supply but on the optimization of technology, project economics, and environmental benefits.

Table 1
Gas Resources

	Volume in Tcf	Years of Supply[1]
Conventional		
Proved Reserves	193.4[2]	12
Potential Gas	784[3]	49
Sub Total Conventional	977.4	61
Near Term Nonconventional[4] In Place		
Western Tight Sands	900[5]	57
Devonian Shale	2,000[6]	125
Coal Seams	800[7]	50
Co-Production	50+[8]	3
Sub Total Near Term Nonconventional	3,750+	235
Future Nonconventional - In Place		
Geopressured Aquifiers	1,200[9]	
Long Term Research Targets - In Place		
Hydrates (world estimate)	6.7 Million[10]	
Total Resources Which Are Commercially Producing Gas Today	4,470[11]	280[11]

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[1] Calculated at the 1986 production rate of 15,967 Bcf (EIA Monthly Energy Review).

[2] U.S. Crude Oil, Natural Gas, and Natural Gas Liquids, 1985 Annual Report, EIA October 1986.

[3] Potential Supply of Natural Gas in the United States as of December 31, 1984, Potential Gas Committee, Colorado School of Mines.

[4] This category is limited to incremental sources of gas which have (1) the potential for major production in the next decade and (2) the particular source of gas is economically producing gas at current market conditions.

[5] National Petroleum Council, Unconventional Gas Sources, 1980.

[6] Kuuskraa, V.A. and Meyer, R.F., 1980, Review of World Resources of Unconventional Gas.

[7] Rosenberg, R.B. and Sharer, J.C., Gas Research Institute Digest, vol. 2, no.2.

[8] The Gas Energy Supply Outlook Through 2010, October 1985.

[9] Wallace, R.M., Jr., Kraemer, T.F., Taylor, R.E. and Wesselman, J.B., 1979 Assessment of Geothermal Resources of the United States, 1978. Jones, P.H., 1976, Natural Gas From Unconventional Geologic Sources, National Academy of Sciences.

[10] Dobrynin, Korotajev, Yu, P. and Plyuschev, D.V., 1979, Gas Hydrates - one of the possible energy sources.

[11] Adjusted to eliminate any resources included in both the Conventional and Near Term Nonconventional estimates.

NOTE: The Potential Supply of Natural Gas in the United States as of December 31, 1980, Potential Gas Committee, Colorado School of Mines includes a review of the various estimates of nonconventional gas sources. Only a few of the available references are cited above.

Submitted: March 20, 1987

J. BENNETT JOHNSTON, LOUISIANA, CHAIRMAN

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United States Senate
COMMITTEE ON
ENERGY AND NATURAL RESOURCES
WASHINGTON, DC 20510

March 13, 1987

Mr. Jerome McGrath
President
Interstate Natural Gas Association of America
1660 L St., N.W.
Suite 601
Washington, D.C. 20036

Dear Jerry:

Enclosed please find additonal questions that have been submitted for the hearing record of the March 12 hearing on S. 85. We would appreciate having your responses no later than a week from today, March 20, so that they will be available to the members prior to the Committee's next Business Meeting on March 25 when S. 85 will be on the agenda.

Thank you for your testimony and we look forward to hearing from you again soon.

Sincerely,

Howard M. Metzenbaum

Howard M. Metzenbaum
Chairman
Subcommittee on Energy Regulation
and Conservation

HMM/bm
Enclosure

ADDITIONAL QUESTONS FROM SENATOR JOHNSTON

QUESTION FOR JERRY McGRATH (INGAA)

Some have suggested that all powerplant supplies should be subject to curtailment priorities. That would mean extending the current system of curtailment priorities to transportation gas, as well as to pipelines' system supplies. Could you please give us your views on this idea?

ADDITIONAL QUESTIONS FROM SENATOR FORD

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We touched on the question of making transportation gas subject to curtailment. It was pointed out that a significant percentage of the gas transported by pipelines for others is "interruptible" and thus would be cut off if supplies were short.

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QUESTION FOR JERRY McGRATH (INGAA)

Please provide the Subcommittee with details on the amount of gas demand by the highest priority users on each system represented in INGAA's membership, and the amount of gas subject to FERC curtailment authority carried on each of those systems.

INGAA

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March 20, 1987

The Honorable Howard M. Metzenbaum
Chairman
Subcommittee on Energy Regulation
and Conservation
Committee on Energy and Natural Resources
United States Senate
Washington, D.C. 20510

Dear Chairman Metzenbaum:

Enclosed are INGAA's responses to the additional questions submitted by the Subcommittee following the March 12 hearing on S. 85.

Again, I thank you for allowing INGAA to participate in the hearing and let us know if we can provide any further information.

Sincerely,

Jerome J McGrath

Jerome J. McGrath
President

JJM:mes

Enclosure

cc: Members of Subcommittee

INTERSTATE NATURAL GAS ASSOCIATION OF AMERICA
1660 L STREET, NORTHWEST, WASHINGTON, D.C. 20036-5611 · TELEPHONE 202/293-5770

SENATOR JOHNSTON QUESTION:

Some have suggested that all powerplant supplies should be subject to curtailment priorities. That would mean extending the current system of curtailment priorities to transportation gas, as well as to pipelines' system supplies. Could you please give us your views on this idea?

JERRY McGRATH (INGAA) ANSWER:

In the event of a gas supply shortfall, the FERC has the authority to prescribe how a pipeline's system supply is allocated among the pipeline's customers. These allocations are generally based on established curtailment priorities and filed curtailment plans. However, direct purchases by local distribution companies, end users and brokers/marketers are not subject to these established curtailment priorities and plans. Accordingly, if a supplier for a direct purchase arrangement has insufficient supplies to meet all of its demand, the supplier, not the pipeline or FERC, would have the responsibility for allocating those supplies among the direct customers. In spot market situations, the highest bidder can be expected to receive its gas first. Unless the President declares an emergency under Title III of the NGPA, a pipeline would not be obligated nor would the FERC have the authority to allocate any pipeline system supply to fulfill a direct supplier's deficiencies. Similarly, neither a pipeline nor the FERC can divert direct purchase gas to fulfill any deficiency the pipeline might have in its system supply. Should there be a severe shortage, we could be faced with the stark reality that the FERC has created a new dual market -- the deregulated transportation market and the regulated pipeline market.

I do not recommend extending curtailment authority at this time. In fact, it is hard to envision any curtailment system which could equitably and efficiently mix supplies of gas bought under regulated and deregulated transactions and then reallocate the mix based on federal entitlements. I recommend waiting to see how FERC's proposed new rate policies, which are expected to be released mid-summer, will achieve "methods for rationally allocating supplies and capacity." (Martha O. Hesse Chairman Federal Energy Regulatory Commission, "1987 Natural Gas Strategy," January 15, 1987, at 3.) Moreover, with all regulatory incentives geared to pipelines' abandoning their traditional merchant function, the issue of curtailment priorities and plans could soon be almost totally out of the pipelines' hands and in the hands of the direct purchaser and his supplier.

SENATOR FORD QUESTIONS:

We touched on the question of making transportation gas subject to curtailment. It was pointed out that a significant percentage of the gas transported by pipelines for others is "interruptible" and thus would be cut off if supplies were short.

a. Who determines when the interruptible gas is, in fact, interrupted?

JERRY McGRATH (INGAA) ANSWER:

Traditionally, pipelines have sold system supply gas, directly or indirectly, to large users on an interruptible basis--to be interrupted if a pipeline's demand exceeds supply. The question, however, refers to a situation where gas is being transported for others on an interruptible basis. In that case, the interruption presumably occurs only if the pipeline lacks the capacity to provide the transportation. In case of a capacity shortage, the capacity is allocated according to a pipeline's tariff on file with the Commission. Commission policies provide that firm sales and transportation service have priority over interruptible transportation customers.

b. If the gas is interrupted, who determines what other customers get that gas?

ANSWER:

If interruptible transportation gas service were to be cut off or reduced because of a capacity shortage, the pipeline would play no role in determining the disposition of the interrupted transportation gas, and it would be left to the direct purchaser and supplier to find an alternative route or to find another market.

c. Does the Federal Energy Regulatory Commission have any authority to determine what customers or what priority of customers get that gas if the transportation is interrupted?

ANSWER:

No, without the President declaring an emergency under Title III of the NGPA, the FERC does not have authority to divert supplies from direct purchase transactions to supplement pipeline supply in a supply shortage situation. Nor, does the FERC have the authority to divert system supply gas to a direct purchaser if its gas is in short supply.

SENATOR METZENBAUM QUESTION:

Please provide the Subcommittee with details on the amount of gas demand by the highest priority users on each system represented in INGAA's membership, and the amount of gas subject to FERC curtailment authority carried on each of those systems.

JERRY McGRATH (INGAA) ANSWER:

Because the industry has not been faced with curtailment since passage of the NGPA, there has been little need to collect and report customer purchasers of gas by end-use priority. We regret that we are unable to respond to this portion of your request. However, local distribution companies may have such data.

With regard to the second part of your request, we have transportation and sales data available on an industry total basis as shown in the table attached. The FERC would have jurisdiction under established curtailment priorities and plans to allocate pipeline system supply (sales as shown in the table). However, unless the President declares an emergency under Title III of the NGPA, neither the pipelines nor the FERC would have the authority to allocate direct purchasers' supplies for the purpose of supplementing pipeline system supply. Nor would the FERC have the authority to appropriate pipeline system supply gas for supplementing direct purchasers' deficiencies.

Table 1

Carriage for Distributors and End Users and Sales Summary

(Quantities in Quads)

	Carriage to Market					
Period	For LDCs	For End Users[a]	Total	Sales	Total Delivered to Market[b]	Carriage Share of Total Delivered to Market (%)
1982	.269	.101	.370	13.364	13.734	3%
1983	.479	.206	.685	12.918	13.602	5%
1984 1st	.152	.114	.266	3.855	4.121	6%
2nd	.145	.126	.271	2.693	2.965	9%
3rd	.133	.149	.282	2.467	2.749	10%
4th	.188	.123	.311	3.094	3.405	9%
Total	.618	.513	1.130	12.110	13.240	9%
1985 1st	.250	.141	.391	3.701	4.092	10%
2nd	.220	.201	.421	2.200	2.621	16%
3rd	.350	.224	.574	1.943	2.517	23%
4th	.537	.234	.771	2.658	3.429	22%
Total	1.357	.800	2.157	10.502	12.659	17%
1986 1st	.585	.220	.805	2.740	3.545	23%
2nd	.691	.264	.955	1.349	2.304	41%
3rd	.796	.264	1.060	1.004	2.064	51%

---

[a] In those cases where utilities purchased natural gas to generate electricity, an end use, the transportation was classified as "carriage for end users."

[b] Total Delivered to Market = Sales + Total Carriage to Market.

Source: INGAA survey of members as reported in INGAA, Issue Analysis, "Carriage in the Third Quarter of 1986," December 1986, Table A-1.

NOTE: For the latest period, response from pipelines representing 90 percent of interstate purchases and production in 1985 according to the Department of Energy, Energy Information Agency, Statistics of Interstate Natural Gas Pipeline Companies, 1985.

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United States Senate
COMMITTEE ON
ENERGY AND NATURAL RESOURCES
WASHINGTON, DC 20510

March 13, 1987

Mr. Kenneth Lay
Chairman and Chief Executive Officer
ENRON Corp.
1400 Smith St.
Houston, TX 77002

Dear Ken:

Enclosed please find additonal questions that have been submitted for the hearing record of the March 12 hearing on S. 85. We would appreciate having your responses no later than a week from today, March 20, so that they will be available to the members prior to the Committee's next Business Meeting on March 25 when S. 85 will be on the agenda.

Thank you for your testimony and we look forward to hearing from you again soon.

Sincerely,

Howard M. Metzenbaum

Howard M. Metzenbaum
Chairman
Subcommittee on Energy Regulation
and Conservation

HMM/bm
Enclosure

ADDITIONAL QUESTIONS FROM SENATOR FORD

QUESTION FOR KEN LAY (ENRON)

We touched on the question of making transportation gas subject to curtailment. You pointed out that a significant percentage of the gas transported by pipelines for others is "interruptible" and thus would be cut off if supplies were short.

a. Who determines when the interruptible gas is, in fact, interrupted?

b. If the gas is interrupted, who determines what other customers get that gas?

c. Does the Federal Energy Regulatory Commission have any authority to determine what customers or what priority of customers get that gas if the transportation is interrupted?

ENRON
CORP

H. Spofford Canfield IV
Vice President
Federal Government Relations

1020 16th Street, N.W.
Washington, D.C. 20036-5754
(202) 828-3366

March 20, 1987

Ms. Betsy Moler
Counsel - Majority
Committee on Energy and Natural Resources
United States Senate
312 Senate Dirksen
Washington, D. C. 20510

Dear Betsy:

Enclosed are responses to several questions which arose from the March 12 hearing on S. 85.

With best regards,

Sincerely,

Spofford

HSC:adl
al/031

ANSWERS TO QUESTIONS FROM SENATOR FORD FROM KENNETH L. LAY

Customer access to supply is bifurcated between system supply where the pipeline serves as both supplier and transporter versus direct sale supply where independent arrangements are made between a non-pipeline supplier and the customer with the pipeline serving only as a transporter.

Existing FERC approved curtailment plans allocate supply under the first arrangement in the unlikely event shortages occur.

The anser to question a) given the circumstances of a direct sale, the producer/marketer or customer determines interruptibility. The contracting parties have beforehand allocated the risk or supply availablility. In the case of users with alternative fuels, either price or supply availability may influence when one's service is interruptible. A pipeline may have interruptible sales of its own with customers. In that case the pipeline or customer may choose not to buy or sell within the confines of existing FERC tariffs.

The answer to question b) again depends on the circumstances. If the supply is not taken, the gas may either go to other customers willing to purchase the gas, i.e. the market will allocate the gas, or if the gas has been temporarily released from the pipeline's system supply, it may be called back to meet contractual or certificated supply requirements.

If the pipeline is supply short, the return of this gas will fall under the pipeline's curtailment plan as outlined in the second paragraph. As an aside, a large portion of direct sale gas moved by intrastate pipelines is subject to curtailment at the individual state level. As I mentioned at the hearing, a lot of interruptible gas is being taken by local distribution companies as part of their own supply portfolio. As regulatory and market events unfold, LDCs may contract for their own direct sales gas in conjunction with pipeline system supplies.

The answer to c) as I understand the question is no and yes. Pipeline tariffs today set out detailed rules regarding firm transportation and interruptible transportation. Interruptible transportation is always subordinated to firm transportation. A party may have independent firm transportation but no guarantee that the FERC can allocate the suppply because the contractual arrangement or supply is separate from transportation. Thus the gas supply situation behind firm transportation, absent the customer bundling both from the pipeline, is a matter between the parties. Again, it is anticipated that those parties with firm transportation will have taken the security of supply into account when the firm transportation agreement is signed. This is a likelihood because the parties must pay for the reservation of capacity whether they use it or not.

If the transportation is interruptible, although the Commission has no power to initially reallocate the supply, it may if the gas is taken back into system supply of the pipeline after interruption or an emergency is declared under 303(d) of the NGPA. One point to remember, however, is that if the interruptible transportation is in fact interrupted, the most likely reason is because firm customers, absent a force majeure event, are utilizing the full capacity of the pipeline.

I appreciate the courtesies extended to me by you and your staff and will be happy to answer any further questions.

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United States Senate
COMMITTEE ON
ENERGY AND NATURAL RESOURCES
WASHINGTON, DC 20510

March 13, 1987

Mr. Kenneth P. Woodcock
Vice President
Applied Energy Services, Inc.
1925 N. Lynn St.
Arlington, VA 22209

Dear Ken:

Enclosed please find additonal questions that have been submitted for the hearing record of the March 12 hearing on S. 85. We would appreciate having your responses no later than a week from today, March 20, so that they will be available to the members prior to the Committee's next Business Meeting on March 25 when S. 85 will be on the agenda.

Thank you for your testimony and we look forward to hearing from you again soon.

Sincerely,

Howard M. Metzenbaum

Howard M. Metzenbaum
Chairman
Subcommittee on Energy Regulation
and Conservation

HMM/bm
Enclosure

ADDITIONAL QUESTIONS FROM SENATOR METZENBAUM

QUESTION FOR AMERICAN PUBLIC POWER ASSOCIATION, EDISON ELECTRIC INSTITUTE, NATIONAL COAL ASSOCIATION, AND APPLIED ENERGY SERVICES

Panelists disagreed on the question of whether coal-based electrical generating facilities are cost-competitive with gas-fired plants. What are the reasons for this difference of opinion?

ADDITIONAL QUESTIONS FROM SENATOR METZENBAUM

QUESTION FOR AMERICAN PUBLIC POWER ASSOCIATION, EDISON ELECTRIC INSTITUTE, NATIONAL COAL ASSOCIATION, AND APPLIED ENERGY SERVICES

Panelists disagreed on the question of whether coal-based electrical generating facilities are cost-competitive with gas-fired plants. What are the reasons for this difference of opinion?

**Applied
Energy
Services,
Inc.**

HAND DELIVERY

March 20, 1987

Mr. Robert Roach
c/o Senator Metzenbaum
Senate Russell Building
Room 140
Washington, D.C. 20510

Dear Mr. Roach:

Enclosed is the response from the additional questions with regard to testimony given at the hearing on March 12 on S.85.

Should you have any questions, please do not hesitate to call.

Sincerely,

Kenneth R. Woodcock / BB

Kenneth R. Woodcock
Vice President

KRW/bmb

Enclosure

1925 North Lynn Street
Arlington, Virginia 22209
(703) 522-1315
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ADDITIONAL QUESTION FROM SENATOR METZENBAUM

QUESTION FOR AMERICAN PUBLIC POWER ASSOCIATION, EDISON ELECTRIC INSTITUTE, NATIONAL COAL ASSOCIATION, AND APPLIED ENERGY SERVICES

I have been asked to present the views of Applied Energy Services, Inc. (AES) regarding the possible reasons why disagreement existed on the question of whether coal-based electrical generating facilities are cost-competitive with gas-fired plants.

As is was pointed out in my testimony during the March 12 hearing on S.85, AES believes that coal-fired facilities are cost-competitive with gas-fired plants.

There are two possible reasons why the disagreement existed. For one, the panelists may not have agreed on the future relationship between natural gas and coal prices. A second possible reason is that the panelists were evaluating the costs of the two options using different time horizons.

AES, as an independent supplier of steam and electricity, must provide low cost electrical power in order to compete. Accordingly, we have evaluated the cost-competitiveness of both coal-fired facilities and gas-fired plants. Using present value cost analysis methods, essentially all of our analyses show that a coal-fired facility will be the least cost power supply option for plants which begin operation in the early 1990's and which are expected to have a commercial life of approximately thirty years.

Obviously, one of the determining factors of a present value cost analysis is the assumption made about the future relationship between gas and coal prices. As I indicated in my testimony, AES expects the spread between gas and coal prices to increase between 1990 and 2020. In reaching this conclusion, we have considered DOE and industry forecasts which predict that gas prices will increase at a rate which is 3-6 percent higher than the rate of inflation, while coal prices are predicted to rise at a rate which is equal to the inflation rate (or slightly higher, depending on transportation costs).

Given the substantially higher capital costs of coal-fired facilities, another significant factor in a present value cost analysis is the period of time over which costs are evaluated. We have concluded that a thirty year time horizon is appropriate for coal-fired plants.

Using the thirty year time horizon and reasonable projections of gas and coal prices, our analyses generally show that the present value of the cost of the coal-fired option is equal to or less than the gas-fired option. Thus, we have concluded that coal-fired facilities are cost-competitive with gas-fired plants.

Of course, using different assumptions about the future spread between gas and coal prices, it is possible that gas-fired plants could be considered to be the lower cost option. Similarly, if shorter term analyses (e.g., 6-10 years) are conducted, the same conclusion would be reached.

However, using what we feel are realistic price spread assumptions and a reasonable time frame for the present value cost analysis, we believe that coal-based electrical generating facilities are very cost-competitive. This cost competitiveness, coupled with the price certainty of coal prices which can be obtained through long term coal supply contracts, leads us to conclude that coal-fired facilities are currently the least cost power supply option.

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United States Senate
COMMITTEE ON
ENERGY AND NATURAL RESOURCES
WASHINGTON, DC 20510

March 13, 1987

Mr. James G. Harlow, Jr.
Chairman and President
Oklahoma Gas and Electric Company
P.O. Box 321
Oklahoma City, OK 73101

Dear Jim:

Enclosed please find additonal questions that have been submitted for the hearing record of the March 12 hearing on S. 85. We would appreciate having your responses no later than a week from today, March 20, so that they will be available to the members prior to the Committee's next Business Meeting on March 25 when S. 85 will be on the agenda.

Thank you for your testimony and we look forward to hearing from you again soon.

Sincerely,

Howard M. Metzenbaum

Howard M. Metzenbaum
Chairman
Subcommittee on Energy Regulation
and Conservation

HMM/bm
Enclosure

ADDITIONAL QUESTIONS FROM SENATOR JOHNSTON

QUESTIONS FOR JIM HARLOW (Oklahoma Gas and Electric/EEI)

Please provide your best estimates of the cost of the National Coal Association's "coal convertability" suggestion.

a. How much per kilowatt (or megawatt) of installed capacity does a new, large-scale conventional natural gas boiler powerplant cost?

b. How much would making such a boiler "coal convertible" add?

c. If the utility were ever to use coal in the powerplant, it would have to install the pollution control equipment. How much would that add?

d. How much would a medium-size gas turbine powerplant with an installed capacity of 250 megawatts cost?

e. How much would making the powerplant "coal capable" (as NCA has defined it) cost?

f. If the utility were ever to use coal in the powerplant, it would have to install the additional equipment. How much would that cost?

g. According to the most recent data available from the Energy Information Administration's Electric Power Monthly (November, 1986) the average costs of gas and oil used to generate electricity last year were $2.36/mmbtu and $2.38/mmbtu respectively. The average cost of coal was $1.60/mmbtu. Given those relative price differences, and assuming that the price of both fuels increases at a rate equal to inflation, how long would it take for a utility to make up the difference in the increased capital cost of a coal-capable plant due to the lower fuel cost of coal? In other words, when would consumers realize a benefit from using coal? Please factor in the increased operating costs of cost vis a vis gas or oil.

QUESTIONS

HEARING ON S. 85

Senator James A. McClure

As I stated in my opening remarks, I do not believe that it is an appropriate role for government to dictate the fuel of choice to be used by electric powerplants and major industrial facilities. However, I do believe that such users should be encouraged to maintain a dual fuel capability in the event of that there are future curtailments of either natural gas or petroleum supplies -- both of which situations occurred in the 1970's.

As the March 11 hearing on the World Oil Outlook highlighted, maintenance of such a dual fuel capability is important when an electric utility intends to rely on imported petroleum supplies.

Although I support repeal of the Fuel Use Act, please answer the following questions:

1. Are not different energy policy questions raised when a utility proposed to use imported oil, rather than natural gas, for new baseload electric power generation?

2. Several of the witnesses observed that baseload electric power generation that relies on coal is cheaper than natural gas or oil fired generation. If that is the case, why would a utility elect to build new, non-coal generating capacity?

3. If a baseload electric power plant were being built today, what are the comparative life expectancies of conventional turbines, compined cycle units, and coal fired generation units?

4. Several of the witnesses have emphasized the advantages of combined cycle electric power generation over conventional gas turbines. Such units are now employed in the Cool Water facility in Southern California which relies on coal derived fuels.

   a. What factors foster the use of combined cycle units over conventional turbines?

   b. What factors will foster an upgrading of combined cycle units so that they can use coal derived fuels?

   c. What circumstances will be required for replication of the Cool Water facility?

5. From an environmental perspective, atmospheric emissions from the combustion of fossil fuels contribute to the so-called "acid rain" and "greenhouse effect"; what are the comparative effects of coal versus natural gas or oil in these regard?

ADDITIONAL QUESTIONS FROM SENATOR METZENBAUM

QUESTION FOR AMERICAN PUBLIC POWER ASSOCIATION, EDISON ELECTRIC INSTITUTE, NATIONAL COAL ASSOCIATION, AND APPLIED ENERGY SERVICES

A number of panelists stated that gas-fired plants can be brought on line much more quickly than coal-based facilities. Please detail your reasons for agreeing or disagreeing with their assertion.

ADDITIONAL QUESTIONS FROM SENATOR METZENBAUM

QUESTION FOR AMERICAN PUBLIC POWER ASSOCIATION, EDISON ELECTRIC INSTITUTE, NATIONAL COAL ASSOCIATION, AND APPLIED ENERGY SERVICES

Panelists disagreed on the question of whether coal-based electrical generating facilities are cost-competitive with gas-fired plants. What are the reasons for this difference of opinion?

ANSWERS TO QUESTIONS FROM SENATOR JOHNSTON

From: James G. Harlow, Jr. (Oklahoma Gas & Electric Co./EEI)

Mr. Chairman, the first set of answers are based on the Oklahoma Gas and Electric system only. I am, therefore, also enclosing a separate answer sheet to Questions A through G supplied by EPRI which will give national averages.

Question A.

How much per kilowatt (or megawatt) of installed capacity does a new, large-scale conventional natural gas boiler powerplant cost?

Answer

A conventional large-scale 500 megawatt natural gas-fired boiler with a conventional steam turbine would cost approximately $455 per kilowatt of installed capacity or a total cost for the unit of $228 million. However, I must emphasize that under today's uncertain load growth and other economic conditions a utility would probably not build this type of large-scale boiler but rather, would prefer the flexibility of a smaller scale, combined-cycle unit in order to minimize costs to the electric consumer.

Question B.

How much would making such a boiler "coal convertible" add?

Answer

The additional cost of enlarging a conventional boiler to accommodate a coal conversion at some future date would be approximately $25 per kilowatt of installed capacity. However, there would be a significant loss in efficiency by the use of a larger boiler. There is also a significant risk that the future coal conversion could never take place because of interim changes in environmental permitting restrictions.

Question C.

If the utility were ever to use coal in the powerplant, it would have to install the pollution control equipment. How much would that add?

Answer

The added cost for pollution control equipment would be approximately $354 per kilowatt or $177 million total added cost based on the 500 megawatts of capacity. However, there would be costs in addition to pollution control equipment such as additional costs for railroad cars, trackage, site preparation, structure modifications, ash handling equipment, coal handling and conveying equip

Answers to Questions from Senator Johnston continued:

ment, boiler modifications, etc.; these additional costs would amount to $480 per kilowatt or $240 million total for a 500 megawatt plant.

Question D.

How much would a medium-size gas turbine powerplant with an installed capacity of 250 megawatts cost?

Answer

The best estimate based on recent information from suppliers and manufacturers is:

(1) A simple cycle combustion turbine (CT), without site-specific costs, and owner's carrying costs would be approximately $239 per installed kilowatt*. Including minimum site-specific and owner's carrying costs , the CT would cost approximately $310 per installed kilowatt or approximately $77.5 million (1987 dollars) for a 250 megawatt plant.

(2) A combined-cycle unit (CC) without site-specific costs and owner's carrying costs would be approximately $390 per installed kilowatt. Including minimum site-specific and owner's carrying costs, the CC unit would cost approximately $510 per installed kilowatt or approximately $127.5 million (1987 dollars) for a 250 megawatt plant.

*GE letter of 7-1-86

Question E.

How much would making the powerplant "coal capable" (as NCA has defined it) cost?

Answer

We are unsure precisely how NCA has defined "coal capable." However, using the coal-gasification/combined-cycle modular approach, the plant could be designed so that it could consume a coal-derived fuel at some future time without major modifications to the internal workings of the plant combustion turbine. The costs could be in the range of $500,000 to $750,000. Using this approach, there is a relatively small cost involved in making the plant coal capable. The major cost would occur when the coal gasification facilities are actually installed.

Page Three--Harlow (OG&E)/EEI

Answers to Questions from Senator Johnston continued:

Question F.

If the utility were ever to use coal in the powerplant, it would have to install the additional equipment. How much would that cost?

Answer

Assuming that this question pertains to a combined-cycle plant as described in the response to Question D., the additional equipment would be the coal gasifier and related equipment.

The 1986 Electric Power Research Institute (EPRI) Technical Assessment Guide (TAG) describes several coal gasification projects. The total plant capital costs range from approximately $1,200 per installed kilowatt to $1,700 per installed kilowatt, which includes the cost of the combustion turbine, the combined- cycle system, and the gasification equipment.

The average total costs of these projects is $1,500/kw. This means that the gasification portion of the costs is about $1,000/kw.

Because the gasification system is a relatively new technology, as it matures, the total cost of the entire system should decline from $1,500/kw as estimated currently, to under $1,000/kw by the mid 1990's.

Question G.

According to the most recent data available from the Energy Information Administration's Electric Power Monthly (November, 1986), the average costs of gas and oil used to generate electricity last year were $2.36/mm Btu and $2.38/mm Btu respectively. The average cost of coal was $1.60/mm Btu. Given those relative price differences and assuming that the price of both fuels increases at a rate equal to inflation, how long would it take for a utility to make up the difference in the increased capital cost of a coal capable plant due to the lower fuel cost of coal? In other words, when would consumers realize a benefit from using coal? Please factor in the increased operating costs of coal vis a vis gas or oil.

Answer

The capital costs of $1,127 per kilowatt for a coal-fired boiler plant versus a combined-cycle natural gas plant capital cost of $510 per kilowatt and fuel prices quoted above produce the result that there will never be a breakeven point over the life of the plant. The gas plant will always be cheaper. However, different fuel price scenarios could result in a different answer.

Answers to Questions from Senator Johnston continued:

Also, it may be prudent during high-load growth periods and projections of strong economic conditions to build large-scale coal-fired plants. But in today's low growth period and uncertain economic conditions, the advantages of the modular combined-cycle units are more favorable. The coal gasification of those combined-cycle units would occur when and if natural gas prices rose to the point of making it economical.

EPRI'S ANSWERS TO QUESTIONS FROM SENATOR JOHNSTON

A) Large conventional natural gas boilers have not been built for a number of years. However, if one assumes that the cost of such a boiler would be close to that of a distillate oil-fired boiler of about 500 MW capacity then one could conclude that its cost would be about $700/KW (1985 dollars; EPRI Technical Assessment Guide, EPRI P-4463-SR, December 1986)

B) Such a boiler would not be convertible directly to coal firing if it had to generate the same number of megawatts since the firebox would be too small by a factor of about two and its heat transfer surface would not be appropriate for coal firing. If one were to design the boiler to be coal capable right from the beginning including the costs of equipment for coal feeding, ash removal, and flue gas desulfurization, its cost would be about $1,260/KW (same basis as above). Subtracting about 30% for the cost of coal handling and effluent cleanup systems would give a cost of about $900/KW for a coal capable natural gas-fired boiler.

C) The cost of the pollution control equipment in the example cited in (B) above would, therefore, be about $360/KW.

D) A simple cycle gas turbine powerplant would cost about $300/KW.

E) If that simple cycle gas turbine would be specified at the time of purchase to be capable of burning coal derived syngas, its cost would be the same as a turbine for burning natural gas. If the unit had to be retrofitted to accept coal-derived gas, it would cost an additional $5-$10/KW.

F) Adding a coal gasification plant and heat recovery steam generator/steam turbine to make a complete IGCC plant would cost about $1,300/KW for a total cost of $1,600/KW. Because of its higher efficiency, this integrated gasification combined-cycle plant would produce electricity at about the same cost as a conventional coal plant equipped with stack gas scrubbers.

G) If the cost of natural gas was $2.36/mm Btu and the cost of coal was $1.60/mm Btu, the additional costs for capital to build a coal-fired baseload unit instead of a gas-fired combined-cycle unit would never be recovered. This would be true at gas prices less than $4/mm Btu.

ANSWERS TO QUESTIONS FROM SENATOR McCLURE

From: James G. Harlow, Jr. (Oklahoma Gas & Electric Co./EEI)

Question 1.

Are not different energy policy questions raised when a utility proposed to use imported oil, rather than natural gas, for new baseload electric power generation?

Answer

Certainly energy policy questions are raised if electric utilities use imported oil rather than the more abundant natural gas, as a powerplant fuel. Because of the over supply of natural gas, wells are being shut-in all over Texas, New Mexico, Louisiana, Oklahoma, Arkansas and other states. The utilization of natural gas as a boiler fuel would indeed help to reduce the nation's dependance on imported oil. This not only benefits electric consumers, but it also helps to reduce the trade deficit, creates jobs, and makes the U.S. more energy independent overall.

We totally agree that it is desirable to have dual fuel capability and that is why the combustion turbine/combined-cycle technology is so important to the electric utility industry. However, these plants have not dual, but three fuel capabilities: oil, gas, and coal (although in new powerplants, oil would be used only in emergency situations). Therefore, these combustion turbine/combined-cycle powerplants will indeed be an asset to the national security of this country.

Question 2.

Several of the witnesses observed that baseload electric power generation that relies on coal is cheaper than natural gas or oil-fired generation. If that is the case, why would a utility elect to build new, non-coal generating capacity?

Answer

Considering all costs (capital, fuel, and plant efficiencies) coal generation is not cheaper than gas for a planned unit. In addition, there are numerous benefits to the consumer with the combustion turbine/combined-cycle approach. These include lower capital costs, shorter lead times, opportunities for incremental capacity expansion, closely matching near term load forecasts and the overall flexibility in capacity additions. There is also benefit in the increased fuel mix diversity (option of three fuels) and fuel use efficiency. Additional advantages are less land and less adverse environmental impact.

If the cost of natural gas was $2.36/mm Btu and the cost of coal was $1.60/mm Btu, the additional costs for capital to build a coal-fired baseload unit instead of a gas-fired combined-cycle

Page Two--Harlow (OG&E)/EEI

Answers to Questions from Senator McClure continued:

unit would never be recovered. This would be true at gas prices less than $4/mm Btu.

Question 3.

If a baseload electric powerplant were being built today, what are the comparative life expectancies of conventional turbines, combined-cycle units, and coal-fired generation units?

Answer

Conventional turbines (simple cycle) generally have a 25-year life expectancy when operated in a baseload mode. Combined-cycle plants and coal-fired plants have a 30-year life expectancy (EPRI Technical Assessment Guide (TAG) estimates 30-year on CTs and CCs and 40-year on coal-fired plants). These time periods are highly dependent upon the quality of maintenance performed on the machinery.

Question 4.a.

What factors foster the use of combined-cycle units over conventional turbines?

Answer

The basic advantage of a combined-cycle plant over a simple cycle gas turbine is the improved heat rate or higher efficiency achieved by combined-cycle operations. The combined-cycle plant is able to convert waste heat to kilowatt heat meaning one can generate more kilowatt hours with the same quantity of fuel compared to a simple cycle turbine.

Simple cycle gas turbines are converted to combined-cycle units when they will be used enough to justify additional capital investment to save fuel. Combined-cycle units use about 1/3 less fuel to generate the same amount of power as a simple cycle unit.

Question 4.b.

What factors will foster an upgrading of combined-cycle units so that they can use coal-derived fuels?

Answer

According to EPRI, the change in a combined-cycle unit to use coal-derived gas is minimal, about $5-$10/kw. A utility would begin to consider doing that as well as installing the gasifica-

Answers to Questions from Senator McClure continued:

tion plant, which is the major cost (about $1,000-$1,100/kw) when the price of natural gas exceeded about $4/mm Btu. The total plant cost would be about $1,500-$1,600/kw.

A natural gas shortage or natural gas prices escalating to levels uneconomical for baseload operation would allow coal-gasification to become economical. However, with the abundance of natural gas being available at present, we do not see either of these events occurring in the near future.

Question 4.c.

What circumstances will be required for replication of the Cool Water facility?

Answer

Although the Cool Water facility is actually operating as a demonstration project, some maturity of the facility is required for a conclusive demonstration of Cool Water's long-term reliability. Also, we anticipate that unit costs will decline as the Cool Water plant matures.

The combined-cycle unit used at Cool Water is an essentially a conventional GE MS7001E 75MW gas turbine which has had minor modifications. An advanced gas turbine of 135MW is now being offered by GE (MS7001F). The Texaco gasifier used at Cool Water processes 1000 t/d of coal. Current designs of Texaco gasifiers would process 1500-2000 TPD of coal.

Question 5.

From an environmental perspective, atmospheric emissions from the combustion of fossil fuels contribute to the so-called "acid rain" and "greenhouse effect"; what are the comparative effects of coal versus natural gas or oil in these regards?

Answer

Electric utility powerplants emit oxides of sulfur and nitrogen which are the chemical constituent precursors to acid deposition. However, current scientific research, both government and privately funded, does not show a causal link between acid deposition and alleged environmental impacts.

Natural gas and oil are generally cleaner burning fuels than coal. However, all of the fuels may be burned in such a manner that they meet all environmental requirements or standards. Meeting the standards is more expensive with coal.

Answers to Questions from Senator McClure continued:

Natural gas-fired plants produce no SOx emissions, and NOx emissions can be controlled to very low levels. Oil-fired units burn oil with various sulfur contents, some of which are high in sulfur content. A comparison of effluents from integrated gasification combined-cycle (IGCC) and conventional coal-fired plants fueled with higher sulfur Illinois coal is given below.

Tons/MW electricity-yr	IGCC	Conventional Coal with FGD
SO2	0.14-4	14
NOx	3	8
Solid Wastes	300	750

ANSWERS TO QUESTIONS FROM SENATOR METZENBAUM

From: James G. Harlow, Jr. (Oklahoma Gas & Electric Co./EEI)

Question 1.

A number of panelists stated that gas-fired plants can be brought on-line much more quickly than coal based facilities. Please detail your reasons for agreeing or disagreeing with their assertion.

Answer

Gas-fired plants can be designed, permitted, and constructed in a shorter period of time than an equivalent coal-fired plant. Gas-fired plants require less time for permitting than coal-fired plants (1 1/2 years versus 2 1/2 years). In some states permitting time can be doubled or tripled for coal-fired plants. They can also be constructed more quickly (2 years versus 3 1/2 years) because much of the equipment is shop fabricated rather than field fabricated. In a gas-fired plant, there is no need for a scrubber, sludge pit, coal conveyors, coal stocking and coal pile design, coal mills, railcar expense and their attendant construction lead time requirements and costs of operation.

Uncertainties in load growth require utilities to choose the least cost, and most flexible approach to generation expansion--the gas-fired combined-cycle. With the combined-cycle, the decision to construct can be made closer to the expected in-service date than an equivalent coal-fired plant. This is even true for coal gasifiers versus coal-fired plants. Coal gasifiers can be standardized easier than coal-fired steam units making equipment more readily available from stock or under construction stock replacement items.

Question 2.

Panelists disagreed on the question of whether coal-based electrical generating facilities are cost-competitive with gas-fired plants. What are the reasons for this difference of opinion?

Answer

As with any generating facility, the mode of operation highly influences the economic breakeven considerations of generation alternatives. Also, the perceived fuel cost differential and fuel availability considerations often dictate whether a technology is viable over the expected life of the plant. There are differing opinions as to what fuel costs are going to be in the future. These items, therefore, become risk analysis items when considering economic alternatives. The assumptions used when evaluating alternatives are different for each utility and each utility has a different set of needs and circumstances.

Page Two--Harlow (OG&E)/EEI

Answers to Questions from Senator Metzenbaum continued:

However, as we have pointed out in our answer to Senator Johnston's Question G. (enclosed) the capital costs of $1,127 per kilowatt for a coal-fired boiler plant versus a combined-cycle natural gas plant capital cost of $510 per kilowatt, and the fuel prices quoted in his question, produce the result that there will never be a breakeven point over the life of the plant. The gas plant will always be cheaper. Also, see EPRI answer to Senator Johnston's Question G.

J. BENNETT JOHNSTON, LOUISIANA, CHAIRMAN

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GARY G. ELLSWORTH, CHIEF COUNSEL FOR THE MINORITY

United States Senate
COMMITTEE ON
ENERGY AND NATURAL RESOURCES
WASHINGTON, DC 20510

March 13, 1987

Mr. Larry Hobart
Executive Director
American Public Power Association
2301 M St., N.W.
Washington, D.C. 20037

Dear Larry:

Enclosed please find additonal questions that have been submitted for the hearing record of the March 12 hearing on S. 85. We would appreciate having your responses no later than a week from today, March 20, so that they will be available to the members prior to the Committee's next Business Meeting on March 25 when S. 85 will be on the agenda.

Thank you for your testimony and we look forward to hearing from you again soon.

Sincerely,

Howard M. Metzenbaum

Howard M. Metzenbaum
Chairman
Subcommittee on Energy Regulation
and Conservation

HMM/bm
Enclosure

ADDITIONAL QUESTIONS FROM SENATOR METZENBAUM

QUESTION FOR AMERICAN PUBLIC POWER ASSOCIATION, EDISON ELECTRIC INSTITUTE, NATIONAL COAL ASSOCIATION, AND APPLIED ENERGY SERVICES

A number of panelists stated that gas-fired plants can be brought on line much more quickly than coal-based facilities. Please detail your reasons for agreeing or disagreeing with their assertion.

AMERICAN ASSOCIATION
2301 M STREET NW WASHINGTON DC 20037 · 202/775-8300

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Kansas Municipal Energy Agency
Mission, Kansas
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Utah Associated Municipal Power Systems
Sandy, Utah
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Intermountain Power Agency
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Tipton, Indiana
C.M. PERKINS
Salt River Project
Phoenix, Arizona
GEORGE D. REICH
Plattsburgh, New York
CHARLES F. ROSSOLL
Norwich, Connecticut
ROBERT E. ROUNDTREE
Springfield, Missouri
DON E. SCHAUFELBERGER
Nebraska Public Power District
Columbus, Nebraska
E.C. SHREVE, JR.
Florida Municipal Utilities Association
Tallahassee, Florida
DONALD L. STOKLEY
Municipal Electric Authority of Georgia
Atlanta, Georgia
WILLIAM G. TOBIN
Rock Rapids, Iowa

March 23, 1987

The Honorable Howard Metzenbaum
Chairman
Subcommittee on Energy Regulation
and Conservation
Committee on Energy and Natural
Resources
SD-354 Dirksen Senate Office Building
Washington, D.C. 20510

ATTN: Elizabeth A. Moler

Dear Senator Metzenbaum:

Enclosed please find APPA's response to the additional questions received with your letter of March 13, 1987.

Sincerely,

Daniel G. Lewis

Daniel G. Lewis
Director of Technical Services

DL:lb

RESPONSE OF THE AMERICAN PUBLIC POWER ASSOCIATION TO ADDITIONAL QUESTIONS ASKED BY SENATOR HOWARD METZENBAUM, CHAIRMAN, SUBCOMITTEE ON ENERGY REGULATION AND CONSERVATION

The American Public Power Association's assertion (in its March 12, 1987 statement) that construction cycles for gas-fired plants are much shorter than for coal-fired plants is based on various government and industry data sources. A recent and authoritative example of such sources is the Electric Power Research Institutes report: Technical Assessment Guide Vol.1: Electricity Supply 1986 (EPRI P-4463-SR.) Pages B-33, B-35, B-37, B-83, and B-85 of this report show expected total lead-time for coal-fired plants of 7 to 9 years, and total lead-time for gas-fired plants of 3 years. Copies of these pages from the report are attached.

Exhibit B.5-1B

COAL-STEAM WITH WET LIMESTONE FGD SUPERCRITICAL - BITUMINOUS

Region: East/West Central

Technology Number (a)	1.1	1.2	1.3
Unit Size, MW	1000	500	500
Available for Commercial Orders, Year	1985	1985	1985
First Commercial Service, Year	1985	1985	1985
Plant Capital Cost (b), $/kW based on			
Plant Size of (no. of units x unit size)	2 x 1000	2 x 500	1 x 500
Total Plant Cost, Dec 1984 $ (a)	957	1061	1147
Total Cash Expended (mixed year $)	855	947	1053
AFDC (interest during construction)	226	251	203
Total Plant Investment (includes AFDC)	1081	1198	1256
Startup, Inventory, Land	62	67	69
Total Capital Requirement, Hypothetical Jan 1985 In-Service (includes AFDC)	1143	1265	1325
Operation and Maintenance Costs (b), 1985 Costs in Dec 1984 $			
Fixed, $/kW-yr	17.2	20.1	23.9
Incremental, mills/kWh:			
Variable	1.6	1.9	2.3
Consumables	3.1	3.1	3.1
Net Heat Rate, Btu/kWh			
Full Load	9450	9450	9450
75% Load	9690	9690	9690
50% Load	10300	10300	10300
25% Load	12200	12200	12200
Average Annual	9660	9660	9660
Unit Availability (b)			
Planned Outage Rate, %	10.1	11.5	11.5
Unplanned Outage Rate, %	13.7	12.0	12.0
Equivalent Unplanned Outage Rate, %	21.9	19.5	19.5
Operating Availability, %	77.6	77.9	77.9
Equivalent Availability, %	70.2	71.2	71.2
Average Daily Unavailability, ADU, %	9.5	8.6	8.6
Capability Ratio	1.45	1.31	1.31
Duty Cycle	BASE	BASE	BASE
Minimum Load, %	25	25	25
Preconst, License, & Design Time, Years	4	4	4
Idealized Plant Construction Time, Years	5	5	4
Unit Life, Years	40	40	40
Technology Development Rating	Mature	Mature	Mature
Design & Cost Estimate Rating	Prelim	Prelim	Prelim

total lead Time = sum

(a) See Section B.5.8 for definition of terms.
(b) For mature plant. Estimated cost ranges in Table C-2, Appendix C.
Reference Report: EPRI PE-1865 (see Section B.8).

Exhibit B.5-2B

COAL-STEAM WITH WET LIMESTONE FGD SUBCRITICAL - BITUMINOUS

Region: East/West Central

Technology Number (a)	2.1	2.2	2.3	
Unit Size, MW	500	200	500	
Available for Commercial Orders, Year	1985	1985	1985	
First Commercial Service, Year	1985	1985	1985	
Plant Capital Cost (b), $/kW based on				
Plant Size of (no. of units x unit size)	2 x 500	1 x 200	1 x 500	
Total Plant Cost, Dec 1984 $ (a)	1055	1577	1142	
Total Cash Expended (mixed year $)	942	1489	1049	
AFDC (interest during construction)	250	186	202	
Total Plant Investment (includes AFDC)	1192	1675	1251	
Startup, Inventory, Land	68	91	70	
Total Capital Requirement, Hypothetical Jan 1985 In-Service (includes AFDC)	1260	1766	1321	
Operation and Maintenance Costs (b), 1985 Costs in Dec 1984 $				
Fixed, $/kW-yr	20.0	37.6	24.0	
Incremental, mills/kWh:				
Variable	1.9	3.6	2.3	
Consumables	3.2	3.2	3.2	
Net Heat Rate, Btu/kWh				
Full Load	9850	9870	9850	
75% Load	9950	-	9950	
50% Load	10450	-	10450	
25% Load	12570	-	12570	
Average Annual	10060	10170	10060	
Unit Availability (b)				
Planned Outage Rate, %	11.5	9.4	11.5	
Unplanned Outage Rate, %	12.0	7.9	12.0	
Equivalent Unplanned Outage Rate, %	19.5	12.4	19.5	
Operating Availability, %	77.9	83.4	77.9	
Equivalent Availability, %	71.2	79.3	71.2	
Average Daily Unavailability, ADU, %	8.6	4.9	8.6	
Capability Ratio	1.31	1.16	1.31	
Duty Cycle	BASE	BASE	BASE	
Minimum Load, %	25	25	25	
Preconst, License, & Design Time, Years	4	4	4	Sum
Idealized Plant Construction Time, Years	5	3	4	
Unit Life, Years	40	40	40	
Technology Development Rating	Mature	Mature	Mature	
Design & Cost Estimate Rating	Prelim	Prelim	Prelim	

(a) See Section B.5.8 for definition of terms.
(b) For mature plant. Estimated cost ranges in Table C-2, Appendix C.
Reference Report: EPRI PE-1865 (see Section B.8), Project RP 1860-3 (report in preparation).

Exhibit B.5-3B

COAL-STEAM WITH WET LIME FGD - SUBBITUMINOUS

Region: East/West Central

	SUPERCRIT	SUBCRIT	SUBCRIT	
Technology Number (a)	3.1	3.2	3.3	
Unit Size, MW	500	500	330	
Available for Commercial Orders, Year	1985	1985	1985	
First Commercial Service, Year	1985	1985	1985	
Plant Capital Cost (b), $/kW based on				
Plant Size of (no. of units x unit size)	2 x 500	2 x 500	3 x 330	
Total Plant Cost, Dec 1984 $ (a)	1053	1060	1200	
Total Cash Expended (mixed year $)	941	947	1072	
AFDC (interest during construction)	249	251	284	
Total Plant Investment (includes AFDC)	1190	1198	1356	
Startup, Inventory, Land	69	70	75	
Total Capital Requirement, Hypothetical Jan 1985 In-Service (includes AFDC)	1259	1268	1431	
Operation and Maintenance Costs (b), 1985 Costs in Dec 1984 $				
Fixed, $/kW-yr	18.5	18.5	23.6	
Incremental, mills/kWh:				
Variable	1.7	1.8	2.2	
Consumables	1.2	1.4	1.3	
Net Heat Rate, Btu/kWh				
Full Load	9650	10030	10050	
75% Load	9860	10130	-	
50% Load	10480	10640	-	
25% Load	12420	12800	-	
Average Annual	9730	10070	10070	
Unit Availability (b)				
Planned Outage Rate, %	11.5	11.5	11.5	
Unplanned Outage Rate, %	12.0	12.0	12.0	
Equivalent Unplanned Outage Rate, %	19.5	19.5	19.5	
Operating Availability, %	77.9	77.9	77.9	
Equivalent Availability, %	71.2	71.2	71.2	
Average Daily Unavailability, ADU, %	8.6	8.6	8.6	
Capability Ratio	1.31	1.31	1.31	
Duty Cycle	BASE	BASE	BASE	
Minimum Load, %	25	25	25	
Preconst, License, & Design Time, Years	4	4	4	Sum
Idealized Plant Construction Time, Years	5	5	5	
Unit Life, Years	40	40	40	
Technology Development Rating	Mature	Mature	Mature	
Design & Cost Estimate Rating	Prelim	Prelim	Prelim	

(a) See Section B.5.8 for definition of terms.
(b) For mature plant. Estimated cost ranges in Table C-2, Appendix C.
Reference Reports: EPRI PE-1865, P-4542 (see Section B.8).

Exhibit B.5-26B

LIQUID/GAS FUEL COMBUSTION TURBINE - CONVENTIONAL

Region: East/West Central

	DISTILLATE	RESIDUAL
Technology Number (a)	46.1	46.2
Unit Size, MW	75	75
Available for Commercial Orders, Year	1985	1985
First Commercial Service, Year	1985	1985
Plant Capital Cost (b), $/kW based on		
Plant Size of (no. of units x unit size)	1 x 75	1 x 75
Total Plant Cost, Dec 1984 $ (a)	269	296
Total Cash Expended (mixed year $)	269	296
AFDC (interest during construction)	0	0
Total Plant Investment (includes AFDC)	269	296
Startup, Inventory, Land	26	24
Total Capital Requirement, Hypothetical Jan 1985 In-Service (includes AFDC)	295	320
Operation and Maintenance Costs (b), 1985 Costs in Dec 1984 $		
Fixed, $/kW-yr	0.4	0.5
Incremental, mills/kWh:		
Variable	4.0	4.6
Consumables	0.0	0.0
Net Heat Rate, Btu/kWh		
Full Load	11600	11800
75% Load	12250	12450
50% Load	14050	14300
25% Load	-	-
Average Annual	13800	14000
Unit Availability (b)		
Planned Outage Rate, %	5.0	5.0
Unplanned Outage Rate, %	4.3	4.3
Equivalent Unplanned Outage Rate, %	4.3	4.3
Operating Availability, %	90.9	90.9
Equivalent Availability, %	90.9	90.9
Average Daily Unavailability, ADU, %	0.0	0.0
Capability Ratio	1.05	1.05
Duty Cycle	PEAK	PEAK
Minimum Load, %	1	1
Preconst, License, & Design Time, Years	2	2
Idealized Plant Construction Time, Years	1	1
Unit Life, Years	30	30
Technology Development Rating	Mature	Demo
Design & Cost Estimate Rating	Smplfd	Smplfd

Sum

(a) See Section B.5.8 for definition of terms.
(b) For mature plant. Estimated cost ranges in Table C-2, Appendix C.
Reference: In-house estimates.

Exhibit B.5-27B

LIQUID/GAS FUEL COMBUSTION TURBINE - ADVANCED

Region: East/West Central

	DISTILLATE	RESIDUAL	
Technology Number (a)	47.1	47.2	
Unit Size, MW	130	130	
Available for Commercial Orders, Year	1987	1987	
First Commercial Service, Year	1989	1989	
Plant Capital Cost (b), $/kW based on Plant Size of (no. of units x unit size)	1 x 130	1 x 130	
Total Plant Cost, Dec 1984 $ (a)	248	274	
Total Cash Expended (mixed year $)	248	274	
AFDC (interest during construction)	0	0	
Total Plant Investment (includes AFDC)	248	274	
Startup, Inventory, Land	25	22	
Total Capital Requirement, Hypothetical Jan 1985 In-Service (includes AFDC)	273	296	
Operation and Maintenance Costs (b), 1985 Costs in Dec 1984 $			
Fixed, $/kW-yr	0.4	0.5	
Incremental, mills/kWh:			
Variable	4.0	4.6	
Consumables	0.0	0.0	
Net Heat Rate, Btu/kWh			
Full Load	11000	11200	
75% Load	12900	13100	
50% Load	13325	13550	
25% Load	-	-	
Average Annual	13100	13300	
Unit Availability (b)			
Planned Outage Rate, %	5.0	5.0	
Unplanned Outage Rate, %	4.3	4.3	
Equivalent Unplanned Outage Rate, %	4.3	4.3	
Operating Availability, %	90.9	90.9	
Equivalent Availability, %	90.9	90.9	
Average Daily Unavailability, ADU, %	0.0	0.0	
Capability Ratio	1.05	1.05	
Duty Cycle	PEAK	PEAK	
Minimum Load, %	1	1	
Preconst, License, & Design Time, Years	2	2	Sum
Idealized Plant Construction Time, Years	1	1	
Unit Life, Years	30	30	
Technology Development Rating	Pilot	Pilot	
Design & Cost Estimate Rating	Goal	Goal	

(a) See Section B.5.8 for definition of terms.

(b) For mature plant. Estimated cost ranges in Table C-2, Appendix C.

Reference: In-house estimates.

APPENDIX II

Additional Material Submitted for the Record

PGC PROCESS GAS CONSUMERS GROUP · SUITE 800/1666 K STREET, N.W.
WASHINGTON, D.C. 20006
202 887-3425

March 11, 1987

The Honorable Howard M. Metzenbaum
Chairman
Subcommittee on Energy Regulation and Conservation
Committee on Energy and Natural Resources
United States Senate
140 Russell Office Building
Washington, DC 20510

Dear Mr. Chariman:

Attached please find a copy of the statement of the Process Gas Consumers Group on S.85, which is the topic of the hearing of your Subcommittee tomorrow, March 12, 1987. We would very much appreciate it if you could make this statement a part of the record of this hearing. Should you or your staff have any questions or comments about the position of the Process Gas Consumers Group on S.85, please do not hesitate to contact us.

Sincerely,

Jan B. Vlcek

JBV/nrk

Attachment

PGC
PROCESS GAS CONSUMERS GROUP · SUITE 800/1666 K STREET, N.W.
WASHINGTON, D.C. 20006
202 887-3425

BEFORE THE

SUBCOMMITTEE ON ENERGY REGULATION AND CONSERVATION

COMMITTEE ON ENERGY AND NATURAL RESOURCES

UNITED STATES SENATE

STATEMENT OF

THE PROCESS GAS CONSUMERS GROUP

March 12, 1987

STATEMENT OF

THE PROCESS GAS CONSUMERS GROUP

March 12, 1987

The Process Gas Consumers Group (PGC) is an organization of eighteen large industrial consumers of natural gas organized to promote the development and adoption of coordinated, rational, and consistent federal and state policies with respect to gas use. Representing many of the nation's basic industries, our member companies own and operate hundreds of plants in virtually every state and purchase natural gas directly or indirectly from both interstate and intrastate pipelines, with most of our facilities on the interstate system. A list of our members is included as Attachment 1.

I. PGC's Perspective

PGC members are energy intensive companies that individually spend as much as $200 million per year for their natural gas needs, consuming natural gas in manufacturing applications, including process, nonprocess, and boiler. From our perspective, there are two paramount natural gas issues: (1) security of supply and (2) price.

Security of supply means to us the ability of consumers to depend upon their suppliers to satisfy their gas requirements. The current deliverability surpluses do not give us any significant comfort, because we remain skeptical that those resources will be efficiently produced, distributed, and replaced in a market that remains partially regulated under the Natural Gas Policy Act.

Natural gas prices, as with other inputs into the manufacturing process, present costs which must be recovered by companies in the prices charged for their products. We are willing to pay free market prices for gas, but we are strongly opposed to (1) paying prices higher than those which would be commanded in a truly free market and (2) paying a disproportionate share of gas costs so that other gas consumers can be subsidized, such as through so-called incremental or marginal cost-based pricing schemes. We believe that rates should be based on the cost of providing service. As consumers operating in competitive national and international markets, we and the Nation cannot tolerate the impact of artificially high gas prices on our businesses.

The gas market in recent years has been characterized by wildly disparate prices at the wellhead -- some far below "market clearing" and others substantially above it. Many pipelines have experienced industrial load losses caused by the purchase of expensive supplies under strict take-or-pay provisions which have, in effect, shut off cheaper supplies. High cost supplies were produced before lower-cost supplies, which further depressed demand and distorted the signals sent back to producers as to future gas needs, possibly setting the stage for potential future price premiums and shortages. Notwithstanding today's low oil prices, some pipelines continue to purchase expensive gas even though their own sales rates are higher than a free marketplace would permit. This situation is exacerbated by the significant barriers that remain to end user access to lower-priced supplies, barriers which also prevent producers from selling their lower-priced supplies into market and thus receiving much needed cash flow to encourage future drilling.

In the face of these problems, PGC believes that the interests of all involved in the natural gas industry -- producers, pipelines, distributors, end users, marketers, etc. -- will best be served by making the purchase, sale, and transportation of natural gas as marketoriented as possible. To accomplish this effectively, any legislative proposal must recognize and deal with the reality of today's gas market. Piecemeal tinkering with only one industry segment's perceived problems will merely continue or exacerbate the market distortions we have described. Thus, for example, to be meaningful, any legislation to assist the gas market must contain strong provisions for open access to nondiscriminatory transportation of both firm and interruptible gas supplies, because this will benefit end users, producers, pipelines and distributors by allowing market forces to eliminate bottlenecks in the system. For example, open access could assist in reversing the decline in drilling activities presently occurring as producers have difficulty in finding markets for their currently available gas and therefore are not willing to invest in exploration efforts for developing future supplies. In this spirit, PGC strongly supports legislation such as "The Natural Gas Policy Act Amendments of 1987 recently proposed by the Administration as part of S.539, its international competitiveness package. We do not think that legislation such as S.85, which is limited to repeal of the Fuel Use Act and incremental pricing, will have any meaningful impact on market problems being faced today by all segments involved in the natural gas industry.

II. Specific Comments on Legislative Provisions

A. Open and Nondiscriminatory Access to Transportation

The single most important issue to PGC is the need for legislation providing for open, nondiscriminatory access to transportation of natural gas.

Order 436, issued on October 9, 1985 by the Federal Energy Regulatory Commission, represents the high-water mark for attempts to provide open, nondiscriminatory transportation in the natural gas industry. Yet, although Order 436 is almost 18 months old, only one pipeline, Columbia, is today operating under a permanent Order 436 program. Thus, open and nondiscriminatory access to transportation remains generally uncertain. While the Commission has considered and approved 436 certificates for several other pipelines, those pipelines have balked at the modifications imposed by the FERC to conform so-called "settlements" to the intent of 436. This is amply demonstrated by the attached summary of the status of the 436 program on major pipeline systems. The delay on the Federal level is in turn delaying effective state action for open access at the local distribution company level. Thus, while PGC strongly supports Order 436, we believe that

Congressional action is needed to bring about open, nondiscriminatory transportation in the natural gas industry. Such action is especially warranted now as the interim transportation arrangements allowed by FERC under NGPA Section 311 as a transition to implementation of Order 436 will be terminated on May 1. In addition, the whole Order 436 process is in jeopardy because of the pending challenge in the Court of Appeals to the Commission's authority to encourage transportation under the Order.

There are several reasons why Order 436 has not resulted in the widespread availability of nondiscriminatory transportation. First, Order 436 is voluntary; pipelines need not open their systems to nondiscriminatory transportation unless they choose to do so. Second, those pipelines that have considered opening their systems pursuant to Order 436 have often proposed conditions, some of which have been rejected by the FERC, that undermine the basic content of that order and are blatantly discriminatory against end-user shippers as compared to distributors. Finally, pipelines are still permitted to obtain transportation authorization through a Section 7(c) certificate of public convenience and necessity without subjecting themselves to the conditions of Order 436; the FERC has in the past granted approval of dozens of such transactions, even though proposed on a blanket, non-individual basis. These three reasons are discussed more fully below.

The first and most obvious reason that pipelines have not implemented the open access provisions of Order 436 is that FERC believes that it lacks authority under existing law to compel contract carriage of gas. Thus, a pipeline can exercise its monopoly power by refusing to open its system and in fact, many pipelines have done exactly that. So long as offering transportation remains purely voluntary, pipelines can, as a practical matter, insist upon unreasonable and/or discriminatory conditions as "the price" of transportation. For example, some pipelines have used this leverage to (a) announce that they won't accept an Order 436 certificate as conditioned by FERC, (b) to break off 436 settlement negotiations due to impasses over pipeline conditions, or (c) to make clear that, unless they get what they want, they will simply not offer transportation service. If open access, nondiscriminatory transportation were legislated, pipelines would not be able to play these regulatory games at the expense of distributors and consumers. So long as the pipelines' choice remains purely voluntary, truly open, non-discriminatory transportation will never become a reality.

A second, related problem is that pipelines that have considered implementing Order 436 have proposed conditions which would undercut, and in some cases negate, its basic intent. Several pipelines are currently attempting to "negotiate" so-called "settlement" agreements in pending rate cases which include provisions purporting to implement Order 436. However, armed with the threat of not accepting the Order, several pipelines have attempted to demand settlement agreements that often contradict the goals and express terms of Order 436 including its key requirement of non-discrimination. In some FERC proceedings, for example, pipelines have agreed with their traditional wholesale customers — including local distributors and fellow interstate pipelines — to divide transportation rights in order to preserve their collective positions as monopolistic sellers through a variety of rate and service preferences which dramatically limit producers' and end users' ability to obtain fair, reliable transportation services. When the Commission has refused to accept these settlements without modification, the pipelines have balked and, to date, only one 436 certificate is in place. For example, while Order 436 mandates the allocation of capacity on a "first-come, first-served" basis, some pipelines and distributors have insisted on service preferences for their own sales and for distributor sales customers, while producers and end users are left to accept the lowest quality interruptible service. To the extent that pipelines continue to insist on such conditions as the price for accepting Order 436, truly open, nondiscriminatory transportation will never occur.

The third major problem with the implementation of Order 436 is that pipelines have another transportation alternative. A growing number of pipelines have received individual Section 7(c) certificates of convenience and necessity authorizing them to transport gas for specified shippers. Pipelines can, in that manner, transport gas without subjecting themselves to the Order 436 conditions such as CD reduction. Although FERC has said that users or producers who are discriminated against can file complaints, that is rarely a realistic option for users or producers. Since the burden of proof is on the shipper (even though the pipeline itself possesses the data on which the complaint must be based), a complaint proceeding at FERC can take one to three years and is therefore utterly useless in a fast changing energy market.

Given these problems, if Congress is to deal effectively with the gas issue, it must address the fact that interstate pipelines and many distribution companies have tended to act as obstacles to the operation of competitive forces that would smooth out price and supply distortions resulting from the NGPA. Because their facilities are essential to delivering gas to their customers, interstate pipelines and distribution companies have the power to act as bottlenecks to prevent or substantially limit meaningful gas price competition within their service areas. As the above-described problems illustrate, Order 436 is being thwarted by many pipelines, sometimes with the acquiescence of their distribution customers, and even over the objections of end users, producers, and state public utility commissions. The only real solution to these problems is for the Congress to remove the barriers to entry erected by current pipeline practices and legislatively to provide for open access transportation.

B. Repeal of Incremental Pricing and the Fuel Use Act

PGC also favors the repeal of the Fuel Use Act, as provided in H.R. 309, but believes that such repeal should occur as part of a natural gas legislative proposal which also deals with today's real market problems, such as needed access to open, and nondiscriminatory transportation.

The Fuel Use Act, contrary to the assertions of some, does not currently constitute a barrier to industrial utilization of natural gas. As a major trade association of industrial users, many of whom are potentially affected by the FUA's prohibition on industrial use of gas or oil, PGC disagrees that repeal of FUA will do anything to assist our current inability to obtain gas for our plants. Apparently, many in Congress and elsewhere believe that a bill which only repeals FUA and incremental pricing, such as S.85, would constitute a solution to the current problems of the natural gas market. For example, an American Gas Association study of August 31, 1984, entitled "Projected Economic and Environmental Impacts of Retaining the Fuel Use Act Through the Year 2000," tries to make the case for legislation limited to FUA repeal by claiming that 1.9 quadrillion Btu's of gas would be available to industrial users annually if only FUA were repealed. On page 7, this study makes the rather extraordinary underlying assumption:

> ". . . it was assumed that the FUA exemption process is effectively inoperative. . . . it was assumed that the exemption process would not work as a result of either stringent regulatory enforcement policy, or the fear of plant operators of becoming involved in costly and time-consuming exemption procedures with the ultimate outcome unknown."

For the following reasons, this assumption is patently incorrect and makes the study worthless as any indicator of the real world of industrial gas use. The Fuel Use Act contains a multitude of exemptions from the prohibition on boiler use of natural gas, and under the Reagan Administration's 1981 revision of the Fuel Use Act rules, 46 Fed. Reg. 59872 (December 7, 1981), these exemptions have been very easy to obtain for industrial users. In addition, the alleged impact of the Fuel Use Act is on new facilities and it is existing facilities that could provide the market for gas today, not new plants that may be constructed some time in the future.

What is really affecting on industrial use of natural gas are the continuing refusal of the pipelines and distribution companies to move low-priced natural gas owned by end user shippers from producers to end users, accompanied by the market distortions of wellhead price controls.

PGC agrees that the Fuel Use Act should be repealed, not because of any alleged, but non-existent short term benefits, but because of the potential that the Act could be used by some future Administration to influence industrial fuel use choices as it did before the reforms of 1981. Similarly, incremental pricing can have the effect of distorting price signals, not only as to the current resource cost of gas, but even as to a pipeline's average cost of gas. This is because incremental pricing generally requires that non-exempt industrial boiler fuel users pay a gas price no less than the EIA-determined price of No. 6 oil; this requirement could in certain market circumstances deprive industrial users of the benefits of such producer-pipeline gas price renegotiation as does occur.

But merely to repeal the Fuel Use Act and incremental pricing, as S.85 does, without dealing with the more significant market barriers to natural gas access, would do nothing to increase industrial user's ability to use gas in the current market.

III. Conclusion

In conclusion, PGC strongly supports enactment of legislation which recognizes and deals with the reality of the problems of today's gas markets.

Legislation such as the Administration's bill accomplishes this particularly because of its provision for nondiscriminatory transportation of natural gas. Piecemeal approaches, which deal with limited or non-existent problems, will not provide the type of relief that is needed.

We appreciate the opportunity to present our views to this Subcommittee on this most important topic.

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March 6, 1987

Status of Permanent Open Access Transportation on Major Interstate Pipelines

A. Pipelines that have received and implemented "permanent" open access transportation certificates.

Pipeline	FERC Docket No.	Status
Columbia Gas, Columbia Gulf	RP86-15, *et al.* CP83-452	Blanket certificate issued and accepted. Rates, terms and conditions still being worked out.

B. Pipelines that have said they will implement permanent certificate as soon as received.

Pipeline	FERC Docket No.	Status
Tennessee	RP87-26	Tariff sheets approved subject to refund 1/7/87. Technical conference has been held.

C. Pipelines that have withheld decision on whether to implement permanent Order 436 certificate pending further actions by FERC.

Pipeline	FERC Docket No.	Status
Consolidated	RP85-169	Contested settlement approved with modifications 2/13/87; rehearing requests due 3/16/87.
El Paso	RP86-45	Contested settlement approved with modifications 1/12/87; certificate not accepted yet by El Paso; Commission has granted a 60 day extension of period for El Paso to accept blanket certificate; Fifth and Third Circuit Appeals pending.

Natural	RP86-162	Contested settlement pending before FERC.
Northern Natural	RP85-206	Contested settlement approved with modifications 12/22/86; pending rehearing.
Northwest Central (Williams)	RP86-32, *et al.*	Contested settlement approved with modifications 1/14/87; pending rehearing.
Northwest Pipeline		Contested settlement pending.
Panhandle	RP86-115	Vigorously contested proposal that departs from Order 436. No settlement. No Action.
Texas Eastern	RP85-177	Contested settlement approved with modifications 12/19/86, pending rehearing. Texas Eastern has said it will refuse certificate if FERC does not change its order. (Requests filed 1/20/87).
Texas Gas	RP86-85 CP86-521	Filed certificate application that does not comply with Order 436. No action by FERC. Settlement conferences ongoing.
Transco	TA85-1-29, *et al.*	Contested settlement approved with modifications 2/20/87; pending rehearing (Requests due 3/23/87).
Transwestern Trunkline		Contested settlement approved with modifications; pending on rehearing.
United	CP86-526	Contested settlement pending. (Reply comments filed 1/20/87).

D. Major pipelines that have not filed proposals for permanent Order 436 open access transportation programs:

ANR Pipe Line Corporation
Algonquin Gas Transmission
East Tennessee Gas Pipeline
Florida Gas Gransmission
Mississippi River Transmission
Southern Natural Gas Company and South Georgia Natural Gas

UNITED STATES SENATE
COMMITTEE ON ENERGY AND NATURAL RESOURCES
SUBCOMMITTEE ON ENERGY REGULATION AND CONSERVATION

STATEMENT OF THE

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ON

S. 85, THE NATURAL GAS UTILIZATION ACT OF 1987

MARCH 12, 1987

Statement of the
National Association of Regulatory Utility Commissioners
on
S. 85, The Natural Gas Utilization Act of 1987

Introduction

This statement is submitted for the record to the Subcommittee on Energy Regulation and Conservation of the Senate Committee on Energy and Natural Resources on behalf of the National Association of Regulatory Utility Commissioners (NARUC).

The NARUC is a quasi-governmental, nonprofit organization founded in 1889. Within our membership are the governmental agencies of the fifty States, the District of Columbia, Puerto Rico and the Virgin Islands which are engaged in the regulation of utilities and carriers. Our chief objective is to serve the consumer interest by seeking to improve the quality and effectiveness of government regulation in America.

The Association greatly appreciates this opportunity to make its views known on S. 85, a bill proposing the Natural Gas Utilization Act of 1987. The NARUC believes that repeal of Title II of the Powerplant and Industrial Fuel Use Act (FUA)[1] and the incremental pricing provisions of the Natural Gas Policy Act (NGPA)[2] will benefit consumers by providing for lower cost electricity generation and, and in addition, will foster compliance with air quality standards and help decrease our nation's over-dependence on oil.

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[1] 42 U.S.C. Sec. 8301 et seq. (1983).

[2] 15 U.S.C. Sec. 3341 et seq. (1983).

As you know, all but one of the State Public Utility Commissions[3] are charged with the responsibility for regulating retail natural gas sales to residential, commercial and industrial ratepayers. The members of NARUC have endeavored to reach a consensus among the regulators from producing and consuming States and, on November 20, 1985, at its Ninety-seventh Annual Convention in New York, New York, adopted the attached Resolution Urging Repeal of the Fuel Use Act. At our Winter Committee Meetings in February 1987, the NARUC Committee on Gas examined S. 85 and agreed to stand by its earlier position and reaffirm the resolution and support S. 85.

The FUA prohibits new electric powerplants and larger industrial facilities from burning gas as a primary energy source. The incremental pricing requirements of the NGPA impose a complicated rate and accounting mechanism that forces gas pipelines and local distribution companies to pass through to industrial boiler users surcharges on their gas rates. Both statutes restrict gas demand at a time when there is an abundance of domestic natural gas. The rest of our statement will describe our reasons for endorsing repeal of the FUA and incremental pricing requirements of the NGPA.

Fuel Use Act Repeal

Rationalizations for continuing Fuel Use Act restrictions are no longer viable. Clearly, there is no longer a shortage of natural gas supplies in the United States and there is the availability of new long-term gas supplies from Canada. This surplus of natural gas is a result of enactment of the NGPA, which eliminated inter/intrastate barriers to the movement of existing natural gas supplies, boosted new gas discoveries, and triggered energy conservation.

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[3] The State of Nebraska does not regulate electric or gas utilities, all of which are owned or regulated by public power districts and municipal governments within its borders.

In order to provide long-term reliable electricity at a reasonable cost to the nations's ratepayers, utilities must be permitted to work in a free marketplace. The Fuel Use Act and other artificial restraints on the market prevent electric utilities from having the flexibility to determine what is economically and technologically feasible. With the passage of S. 85, selections for fuel and technology will be based on economics and demand projections, not on the basis of an outdated Federal mandate. Repeal of the FUA would also encourage the development of a more balanced energy mix which would result in a reduction of oil imports. This would be especially useful in the areas of the country that are dependent on oil, such as New England.

The elimination of the current FUA restrictions on utility powerplants will free utilities wishing to construct a facility that uses gas as the primary fuel source from the uncertain and time consuming exemption process currently conducted by the Department of Energy (DOE). The number of utilities filing exemption petitions with DOE has increased from 9 petitions per quarter during the 1979-1984 period to over 32 petitions per quarter in 1986. With the process taking up to two years and at a cost to the utility of approximately $100,000 to $200,000, it is clearly an unnecessary regulatory burden. Indeed, this long process has probably discouraged many utilities from filing for exemptions at all, resulting in many lost opportunities.

Repeal of the Fuel Use Act and the DOE exemption process will not give utilities the automatic green light to build new gas-fired powerplants. The State Public Utility Commissions will still have the jurisdiction and indeed, the responsibility, to determine the capacity needs of new powerplants in light of regional demand, and whether to include the costs of additional capacity in the rate base. In fact, this authority to set retail electric rates properly lies with the State Commissions and not with a Federal agency.

The NARUC is committed to least-cost resource planning methodologies . A Federal statute that prohibits the use of natural gas or oil in new industrial boilers and powerplants stymies this goal. Fuel market economics vary throughout the country and utilities, with the approval of the State Commissions, are in the best position to determine the most economically feasible fuel and technology for their consumers.

Moreover, in search of least-cost methodologies, FUA repeal would encourage the use of new gas utilization technologies in the industrial market, such as gas-fueled combined cycle powerplants and select use of gas in combination with other fuels, that offer high efficiency and environmental benefits. With the ultimate goal being the provision of power to consumers at the least possible cost, utility operators and industrial users should have the flexibility to use the most cost-effective energy utilization systems, taking into account all relevant factors including siting, capital costs, operation and environmental considerations.

Turning to the question of retaining the Fuel Use Act provisions requiring new powerplants to be "coal capable", the NARUC has no formal position. However, some commissioners are concerned with the possiblity of natural gas becoming scarce at some point in the future and would feel more secure if the "coal capable" safety net were included in the legislation. Another concern would be the perception that many jobs in the coal industry would be lost upon repeal of the FUA potentially causing an economic disaster for some coal producing States. With the cost of a BTU of natural gas running twice that of a BTU of coal, it is unlikely that the coal market will plummet as coal will remain a viable energy option in certain regions of the country.

However, if a coal-capable requirement is included in the legislation the question that remains is, "will the State commissions allow the increased cost of construction and financing for building a coal capable boiler to be included in the rate base?" No one knows for sure and each request will have to be examined on a case by case basis. Therefore, we believe that the decision to build a gas-fired powerplant that is coal-capable should remain with the utilities and the State agencies that regulate them. It would be ill-advised to have the Federal government mandating one standard as what is best for every locality.

Incremental Pricing

The NARUC opposed incremental pricing requirements when the NGPA was adopted in 1978 and has not changed its view. Under the NGPA's incremental pricing system (a complicated ratemaking and accounting mechanism), most gas volumes sold to industrial boilers cannot be priced below the energy equivalent price of residual fuel oil. This policy encourages industrial users to use imported foreign oil rather than pay a premium price for gas under a priority system in which they will be among the first to be terminated in the event of a shortage. This loss of industrial users burdens residential users with significantly higher prices due to the forced absorption of a higher percentage of the fixed costs of the distribution and pipeline companies. In addition, encouraging the consumption of foreign oil is in direct contravention with our nation's energy policy.

Another problem with incremental pricing is that administrative difficulties in the publishing of ceiling prices tends to overprice gas in relation to oil in certain markets resulting in the unnecessary loss of gas load to pipelines and gas utilities. This loss of industrial load results in the shift of fixed cost recovery to other classes of ratepayers, such as residential and commercial consumers.

It is within the jurisdiction of the State Commissions to regulate the rates of local gas distribution companies (LDC). Incremental pricing preempts this State authority to safeguard the ratepayer from the surcharges passed through the LDCs to the industrial consumers. The Federal government should not be involved in retail ratemaking and therefore, the NARUC calls for repeal of the incremental pricing requirements of the NGPA.

Federal-State Joint Board

In order to foster future Federal-State cooperation in natural gas and electric regulatory matters, and to avoid the unwarranted intrusion of Federal control into effective State regulation of retail ratemaking, the NARUC believes S. 85 should be amended to include that a Joint Board be established at the Federal Energy Regulatory Commission (FERC). (See attached proposed amendment)

The NARUC's support for the use of Joint Boards at the FERC is based upon our experience with the highly successful Joint Boards established under section 410(c) of the Communications Act. 47 U.S.C. Sec. 410(c). We believe, as do officials at the Federal Communications Commission (FCC), that the FCC Joint Boards established in recent years have been an indispensable tool in fostering cooperative solutions to the many challenges resulting from the break-up of the Bell system and the development of an increasingly competitive market for communications services. Similar competitive forces have developed in markets for gas and electricity--forces which will clearly affect the regulation of energy utilities at both the Federal and State levels.

Therefore, we believe that the time is right to adopt the FCC Joint Board model for certain proceedings at the FERC. The Nation's natural gas and electricity industries are in the process of transition from a regime of traditional regulatory constraints to systems of supply, transmission, and delivery determined by competition in the marketplace. The transition process to more competitive electricity markets is just beginning, but the potential for change is staggering. It is therefore crucial to have a mechanism whereby Federal and State commissions can cooperate with each other and coordinate regulatory action to assure that the concerns of both are debated and resolved.

Given the momentous changes in energy markets which are now occurring, the need for the Joint Board approach has become acute. FERC Joint Boards, as proposed in the attached Resolution which was adopted by the NARUC at its 98th Annual Convention on November 19, 1986, simply provides the State commissions with a formalized mechanism to advise the FERC on broad issues of National concern. While addressing the need in a direct way, the provisions of the proposal do not interfere with the Commission's full, unfettered authority to resolve issues solely within its jurisdiction.

Use of Joint Boards would ensure that State regulators are permitted to do more than merely comment upon major regulatory proposals. Moreover, providing the States with a more decisive role in the promulgation of Federal regulations is in keeping with State regulators' legal responsibility to see that retail gas and electric rates are just and reasonable. Accordingly, we respectfully urge you to incorporate our propsed amedment into S. 85.

Conclusion

The goal of the NARUC is to safeguard the rights of the consumer and we believe that repeal of the Fuel Use Act and the incremental pricing requirements of the Natural Gas Policy Act will benefit both residential and commercial consumers. In addition, increased demand for American natural gas will provide sorely needed exploration incentives for American gas producers, reduce oil imports, improve the efficient use of our energy utility infrastructure, and eliminate an unnecessary regulatory bureaucracy. Utilities must be permitted to respond to the needs of the marketplace with a flexible approach to technology and fuel selection and be held accountable for their choices by the State Public Utility Commissions.

The NARUC therefore, respectfully urges the Committee and the Congress to pass S. 85, with our proposed amendment, in an expeditious manner and not wait for inclusion in related energy legislation so as to benefit the nation's energy consumers as soon as possible.

Note: Ohio does not concur with this statement and has filed its views separately.

Attachment 1

Resolution Urging Repeal of the Fuel Use Act

WHEREAS, The Powerplant and Industrial Fuel Use Act (FUA) was passed in 1978 as one of the five legislative components of the National Energy Act; the purpose of the FUA was to shift electric utility and large industrial boilers from oil and natural gas to coal; and subject to certain exemptions, the FUA prohibits the use of oil or natural gas as a primary fuel in newly constructed boilers; and

WHEREAS, A special exemption is required for the use of gas in cogeneration, despite high energy conservation potential of cogeneration; and no exemptions are available for the select use of natural gas for reducing emissions that would otherwise occur or for the use of gas in any new modular, combined-cycle generators, even though these facilities might represent least-cost electric generation options; and

WHEREAS, The current abundance of domestic natural gas and the increased availability of new long-term gas supplies from Canada obviates the need to retain the FUA; the repeal of the FUA would restore to electric utilities and others the use of natural gas as a clean-burning, economically attractive fuel; and it would encourage the development of a more balanced energy mix, particularly in New England where gas could be used to reduce the region's over-dependence on oil; and

WHEREAS, Since there are no compelling reasons for retaining the FUA and its retention precludes opportunities for consumers to gain the benefits of lower cost electricity generation, the FUA should be repealed promptly as a separate piece of legislation; and its repeal is so important that it should not await inclusion in related energy legislation whose benefits and support may be less certain; now, therefore, be it

RESOLVED, That the National Association of Regulatory Utility Commissioners, assembled in its Ninety-seventh Annual Convention in New York, New York, hereby calls upon the Congress of the United States to repeal Title II of the Powerplant and Industrial Fuel Use Act this Session of Congress as a separate piece of legislation to permit the use of natural gas in utility and other industrial facilities; and be it further

RESOLVED, That the increased use of natural gas in electric and large industrial boilers will foster compliance with air quality standards and help decrease our over-dependence on oil.

Sponsored by the New England Conference of
Public Utilities Commissioners, Inc.
Adopted November 20, 1985

Attachment 2

Resolution Urging the Congress to Establish Federal-State Joint Boards at the FERC

WHEREAS, The public interest demands a balancing of Federal and State regulatory interests in the supply of electricity and natural gas to assure abundant service at affordable rates; and

WHEREAS, A time-proven method for balancing such regulatory interests in the field of communications is reflected by the Federal-State Communications Joint Board Act of 1971 [47 U.S.C., Sec. 410(c)], under which the Federal Communications Commission (FCC) refers to Joint Boards, each composed of three FCC commissioners and four State commissioners selected by the NARUC, proceedings regarding the jurisdictional separation of common carrier property and expenses between interstate and intrastate operations, and other issues of joint Federal-State concern, for the preparation of a recommended decision for review and action by the FCC; and

WHEREAS, The United States Supreme Court in the landmark decision on May 27, 1986, in **Louisiana Public Service Commission v. FCC**, 90 LEd 2d 369, 386, recognized the Federal-State Joint Board process as a vehicle for resolving the tensions inherent in our dual system of regulation; and

WHEREAS, The Federal Power Act (16 U.S.C., Sec. 824h) and the Natural Gas Act (15 U.S.C., Sec. 717p) have long authorized the establishment of joint boards for the consideration of local issues, but they are far too cumbersome for the consideration of national issues since each affected State is entitled to representation on a joint board; and

WHEREAS, The momentous changes now occurring in the energy markets, and the consequent need for greater protection of the interest of local ratepayers, require the establishment of FCC type Federal-State Joint Boards at the Federal Energy Regulatory Commission (FERC) to prepare recommended decisions on national issues of joint Federal-State concern; now, therefore, be it

RESOLVED, That the National Association of Regulatory Utility Commissioners (NARUC), assembled in its Ninety-eighth Annual Convention in Phoenix, Arizona, respectfully urges the Congress of the United States to amend the Federal Power and Natural Gas Acts to establish FCC type Federal-State Joint Boards for use by the Federal Energy Regulatory Commission in deciding national issues of joint Federal-State concern to assure a more effective voice for local ratepayers; and be it further

RESOLVED, That the NARUC respectfully requests the cooperation of the FERC in seeking the passage of such legislation.

Sponsored by the Executive Committee
Adopted November 19, 1986

Attachment 3

ISSUES THAT SHOULD BE REFERRED TO A FEDERAL-STATE JOINT BOARD

Although the transition process to more competitive electricity markets is just beginning, the potential for change is staggering. he FERC's inquiry into electricity transmission and coordination brought to light many issues regarding access and pricing that will have a profound impact on the structure of the electric industry. Federal and State regulators will be faced with issues such as: 1) competitive non-discriminatory access to transmission systems; 2) mandatory wheeling of power; 3) service area bypass; 4) deregulation of generating capacity; 5) jurisdictional separation; and 6) a tendency of interstate utilities to partake in "forum shopping". The need for a mechanism whereby Federal and State commissions manage in this transitional period is crucial. Increased cooperation and coordination must be fostered to assure that the concerns of both Federal and State government are debated and resolved.

Natural gas price controls at the wellhead are being gradually removed as "old gas" supplies are exhausted. Increasingly, gas producers are being forced to compete with each other and with other fuels to maintain their existing markets. As a result, the issue of access to end user markets will become increasingly important as producers seek to sell gas to new, non-traditional purchasers. Similarly, gas consumers will be seeking competitive alternatives to traditional purchases of pipeline-owned gas. This will require new policies, such as FERC's Order No. 436 which enables willing buyers and sellers to transact business.

As a result, the traditional system of gas production, transmission,and delivery in which producers, pipelines, and local distribution companies each play discrete and clearly-defined roles will be replaced by increasingly dispersed and competitive gas markets where buyers and sellers of the commodity deal directly with each other while pipelines become predominantly transporters. These new arrangements will require greater integration of the regulatory decision-making process, a result our Joint Board proposal is intended to provide.

Attachment 4

NARUC Proposed Amendments Establishing Federal-State Joint Boards at the Federal Energy Regulatory Commission

S. 85 is amended by inserting a new Section to read as follows and renumbering Sec. 5 as Sec. 6:

Sec. 5 - Establishment of Federal-State Joint Boards at the Federal Energy Regulatory Commission.

Sec. 5(a) Federal-State Joint Board on Natural Gas Issues.

Section 17 of the Natural Gas Act of 1938 (15 U.S.C. sec. 717p) is amended by adding the following new subsection (d) at the end thereof:

(d) The Commission shall refer any proceeding regarding natural gas prices, rates, service, supply or other national matter of joint Federal-State concern in the regulation of natural gas, which it institutes pursuant to a notice of proposed rulemaking or notice of inquiry, to a Federal-State Joint Board, if elected by the Commission or requested by a majority of the affected States within 30 days after public notice is given of the institution of the proceeding. The Joint Board shall possess the same jurisdiction, powers, duties and obligations as conferred by law upon an administrative law judge appointed by the Commission, and shall prepare a recommended decision for prompt review and action by the Commission. In addition, the State members of the Joint Board shall sit with the Commission en banc at any oral argument or public conference that may be scheduled in the proceeding. The Commission shall also afford the State members of the Joint Board an opportunity to participate in its deliberations, but not vote, when it has under consideration the recommended decision of the Joint Board or any further decisional action that may be required in the proceeding. The Joint Board shall be composed of three Commissioners of the Commission and of four State commissioners nominated by the national organization of the State commissions, as referred to in section 11506(c) of Title 49, United States Code, and approved by the Commission. The Chairman of the Commission, or another Commissioner designated by the Commission, shall serve as Chairman of the Joint Board. The State members of the Joint Board shall be allowed travel expenses, including per diem in lieu of subsistence, in the same manner as persons employed intermittently in Government service are allowed expenses under section 5703 of title 5, United States Code. Such payments shall not render them employees or officials of the United States for any purpose."

Sec. 5(b) Federal-State Joint Board on Electricity Issues.

Subsection (a) of section 209 of the Federal Power Act (16 U.S.C. sec. 824h(a)) is amended by -

(1) inserting "(1)" after "(a)"; and

(2) inserting after paragraph (1) as so designated by this

section the following:

(2) The Commission shall refer any proceeding regarding electric utility prices, rates, service, supply or other national matter of joint Federal-State concern in the regulation of electric utilities, which it institutes pursuant to a notice of proposed rulemaking or notice of inquiry, to a Federal-State Joint Board, if elected by the Commission or requested by a majority of the affected States within 30 days after public notice is given of the institution of the proceeding. The Joint Board shall possess the same jurisdiction, powers, duties and obligations as conferred by law upon an administrative law judge appointed by the Commission, and shall prepare a recommended decision for prompt review and action by the Commission. In addition, the State members of the Joint Board shall sit with the Commission en banc at any oral argument or public conference that may be scheduled in the proceeding. The Commission shall also afford the State members of the Joint Board an opportunity to participate in its deliberations, but not vote, when it has under consideration the recommended decision of the Joint Board or any further decisional action that may be required in the proceeding. The Joint Board shall be composed of three Commissioners of the Commission and of four State commissioners nominated by the national organization of the State commissions, as referred to in section 11506(c) of Title 49, United States Code, and approved by the Commission. The Chairman of the Commission, or another Commissioner designated by the Commission, shall serve as Chairman of the Joint Board. The State members of the Joint Board shall be allowed travel expenses, including per diem in lieu of subsistence, in the same manner as persons employed intermittently in Government service are allowed expenses under section 5703 of title 5, United States Code. Such payments shall not render them employees or officials of the United States for any purpose.

75th ANNIVERSARY
1912 1987
U.S. CHAMBER OF COMMERCE

Albert D. Bourland
Vice President
Congressional Relations

March 16, 1987

The Honorable Howard M. Metzenbaum
Chairman
Subcommittee on Energy Regulation
and Conservation
Committee on Energy and Natural Resources
United States Senate
Washington, D.C. 20510

Dear Mr. Chairman:

Attached is a statement expressing the views of the U.S. Chamber of Commerce on the Fuel Use Act and Incremental Pricing.

The Chamber appreciates your consideration of its views and requests that they be made a part of the hearing record.

Sincerely,

Albert D. Bourland

cc: Subcommittee Members
Daryl Owen, Staff Director
Frank Cushing, Minority Staff Director

1615 H Street, N.W. □ Washington, D.C. 20062 □ 202/463-5600

Statement of the Chamber of Commerce of the United States

ON: THE FUEL USE ACT AND INCREMENTAL PRICING

TO: SUBCOMMITTEE ON ENERGY REGULATION AND
CONSERVATION OF THE SENATE COMMITTEE ON
ENERGY AND NATURAL RESOURCES

BY: SUSAN CONNOLLY MOYA

DATE: MARCH 12, 1987

The Chamber's mission is to advance human progress through an economic,
political and social system based on individual freedom,
incentive, initiative, opportunity and responsibility.

The U.S. Chamber of Commerce is the world's largest federation of business companies and associations and is the principal spokesman for the American business community. It represents approximately 180,000 businesses and organizations, such as local/state chambers of commerce and trade/professional associations.

More than 91 percent of the Chamber's members are small business firms with fewer than 100 employees, 58 percent with fewer than 10 employees. Yet, virtually all of the nation's largest companies are also active members. We are particularly cognizant of the problems of smaller businesses, as well as issues facing the business community at large.

Besides representing a cross section of the American business community in terms of number of employees, the Chamber represents a wide management spectrum by type of business and location. Each major classification of American business--manufacturing, retailing, services, construction, wholesaling, and finance--numbers more than 11,000 members. Yet no one group constitutes as much as 29 percent of the total membership. Further, the Chamber has substantial membership in all 50 states.

The Chamber's international reach is substantial as well. It believes that global interdependence provides an opportunity, not a threat. In addition to the 56 American Chambers of Commerce Abroad, an increasing number of members are engaged in the export and import of both goods and services and have ongoing investment activities. The Chamber favors strengthened international competitiveness and opposes artificial U.S. and foreign barriers to international business.

Positions on national issues are developed by a cross section of its members serving on committees, subcommittees and task forces. Currently, some 1,800 business people participate in this process.

U.S. CHAMBER OF COMMERCE

STATEMENT
on
THE FUEL USE ACT AND INCREMENTAL PRICING
for submission to the
SUBCOMMITTEE ON ENERGY REGULATION AND CONSERVATION
of the
SENATE COMMITTEE ON ENERGY AND NATURAL RESOURCES
by
Susan Connolly Moya*
March 12, 1987

The U.S. Chamber of Commerce is pleased to have this opportunity to express its support of S. 85, introduced by Senators Johnston, Bingaman, Breaux and Domenici. This legislation will repeal the constraints on the use of natural gas and oil, imposed by the Powerplant and Industrial Fuel Use Act of 1978 (PIFUA), and the incremental pricing of natural gas, included in the Natural Gas Policy Act of 1978.

The PIFUA, which prohibits the use of natural gas and oil in most new industrial boiler facilities and virtually all new power plants, has been costly to both the energy industry and consumers by not permitting the use of the most efficient fuel for a given application. Incremental pricing, intended to protect residential fuel users from rising natural gas prices by forcing industrial users to pay a greater share of "new" gas costs (as defined by the Natural Gas Policy Act of 1978), has increased--rather than decreased--residential gas prices. The combined implementation of the PIFUA and incremental pricing requirements has distorted the marketplace and led to the misallocation and misuse of fuels.

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*Manager, Energy and Natural Resources Policy, Resources Policy Department

Whatever the reasons were for the restrictions imposed by the PIFUA and incremental pricing, experience since has shown that they were erroneous. This mistake can now be corrected by speedy adoption of S. 85.

PIFUA and Incremental Pricing

Enactment of the PIFUA and incremental pricing in 1978 resulted from a fear that natural gas was forever to be in short supply and from the Arab oil embargo of 1973. The embargo brought to light our nation's dependence upon imported oil from unreliable suppliers and exacerbated tight gas supplies in interstate gas markets.

Believing that the severe regional gas shortages during the winter of 1976-77 were caused by rapidly depleting gas supplies, federal legislation was enacted to curb the use of what was believed to be a scarce resource. Now, in retrospect, we understand how nearly 25 years of federal wellhead price controls had kept the price of gas below market-clearing levels, thereby discouraging the exploration for and production of this energy source in the mid-1970's. The Wall Street Journal in its February 9, 1987, "Review and Outlook" succinctly described the situation: ". . . there is no such thing as a shortage, there is only a price."

The original purpose of the PIFUA was to force existing utilities and large industrial boilers to stop using natural gas and oil and to prohibit construction of new gas- and oil-fired units. The law requires that all new utility and large industrial boilers must be constructed to be capable of burning alternative fuels, i.e., coal, gas or oil. It also prohibits new boilers from burning oil or natural gas.

It is interesting to note that Congress already has repealed portions of the PIFUA. In 1981 it overwhelmingly repealed the PIFUA's restrictions requiring existing electric power plants to stop using gas completely by 1990.

Incremental pricing, Title II of the Natural Gas Policy Act (part of the same National Energy Act package that contained the PIFUA), was intended to protect residential fuel users from rising natural gas prices by forcing industrial users to pay a greater share of gas costs. It requires that prices charged for gas used by certain industrial boilers must be set at parity to high-sulfur residual oil, regardless of whether the market price of gas would otherwise be less than the price of residual oil.

However well-intentioned, incremental pricing has caused residential gas prices in many areas to go up rather than down. Wherever practicable, industrial users have switched to alternative fuels, leaving residential customers with even greater fixed gas costs than they would have borne if industrial users had continued to burn natural gas. Furthermore, incremental pricing, by artificially raising the price of gas to industrial customers, has impeded gas use in one of its largest and most competitive markets.

Arguments for Repealing the PIFUA and Incremental Pricing

The current surplus of oil and gas worldwide makes this an especially opportune time to repeal the PIFUA and incremental pricing. The conversion of oil-fired power plants to coal virtually has been completed. Oil consumption by electric utilities has fallen by 72 percent since 1978; only about four percent of electricity was generated by oil in 1985.

The U.S. Chamber urges repeal of the PIFUA and incremental pricing, as set forth in S. 85, based on the following additional arguments.

Repeal would:

*open natural gas markets and provide a welcome relief to producers who find themselves with gas to sell but no markets for their product;

*allow electric utilities to reduce costs to consumers by using such promising new technologies as combined-cycle generators;

*reduce environmental pollution by permitting the selective use of natural gas in conjunction with coal or residual fuel oil;

*provide optimal development of co-generation technology, which is currently hindered by the need to receive a PIFUA exemption;

*provide the opportunity to displace foreign oil in select areas;

*enhance our nation's environmental goals becasue gas is clean-burning;

*boost economic growth and international competitiveness, since industrial gas users no longer would be forced to pay artificially inflated rates; and

*eliminate Department of Energy administrative costs and bureaucracy.

Conclusion

Oil price decontrol in 1981 and partial natural gas deregulation over the past few years have shown that a free-market for these fuels works to the advantage of producers, transporters, and consumers alike.

The PIFUA and incremental pricing were based on premises that experience has shown to have been false. Market adjustments have provided more than an adequate supply of natural gas. There is no point in continuing costly policies that we now know are wrong.

C/S/E

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March 16, 1987

The Honorable Howard Metzenbaum
Chairman
Energy Regulation and Conservation Subcommittee
Committee on Energy and Natural Resources
U.S. Senate
Washington, DC 20515

Dear Senator Metzenbaum:

On behalf of our 250,000 members, Citizens for a Sound Economy would like to submit the enclosed comments for the record of the Energy Regulation and Conservation Subcommittee's March 12 hearings on the Fuel Use Act.

Sincerely,

Jerome Ellig

Jerome Ellig
Staff Economist

CITIZENS FOR A SOUND ECONOMY
122 C STREET, NW
SUITE 700
WASHINGTON, DC 20001
(202) 638-1401

C/S/E

"THE FUEL USE ACT AND CONSUMERS"

WRITTEN STATEMENT OF
JEROME ELLIG, STAFF ECONOMIST
CITIZENS FOR A SOUND ECONOMY

SUBMITTED TO:
SUBCOMMITTEE ON ENERGY REGULATION AND CONSERVATION
COMMITTEE ON ENERGY AND NATURAL RESOURCES
U.S. SENATE
MARCH 12, 1987

CITIZENS FOR A SOUND ECONOMY
122 C STREET, NW
SUITE 700
WASHINGTON, DC 20001
(202) 638-1401

MR. CHAIRMAN AND MEMBERS OF THE SUBCOMMITTEE: Thank you for the opportunity to share Citizens for a Sound Economy's views on how the Fuel Use Act and natural gas demand restraints in general affect consumers.

Now in its third year of existence, CSE is a grassroots citizens group with over 250,000 dues-paying individual members. Our members, who live in every state and congressional district, favor repeal of government regulations which impose unnecessary costs on consumers. The Fuel Use Act (FUA) is one such restriction.

The FUA was perhaps understandable in the context of the "energy crisis mentality" of the late 1970s. Government price controls had created shortages of natural gas, and Congress passed the FUA in an effort to direct gas supplies toward residential users. Nevertheless, the fact that imposition of the FUA was understandable does not mean that it was a good idea, even back then.

Over half of natural gas, "new" gas, is now deregulated. The Federal Energy Regulatory Commission has also lifted the maximum price of "old" gas above market-clearing levels. Price can now "do its job" of directing natural gas to its most valuable uses. Regardless of one's position on the wisdom of price controls or on the need for the FUA in the presence of price controls, the fact is that the original rationale for the FUA simply no longer exists.

If the FUA's restrictions on new natural gas boilers merely directed utilities and industrial users of the fuel to do what they would do anyway, the FUA would be redundant and unnecessary. The evidence shows, however, that the FUA in fact induces these businesses to forego gas and pass the increased costs on to consumers.

A study by the Urban Institute estimates that repeal of the Fuel Use Act could save consumers as much as $1.65 billion annually in reduced electric bills and lower prices for energy-intensive goods. Since even those families which use gas for heating and cooking also have substantial electric bills, the study suggests that lower electricity costs would likely outweigh any possible increase in residential gas prices brought on by greater industrial gas demand.

The American Gas Association's admittedly "worst-case" scenario projects that the FUA will, by the year 2000, lead to annual industrial and utility gas demand three quadrillion BTUs lower than it would be in the FUA's absence. Replacing this gas-fired generating capacity with coal-fired capacity could require $44 billion in construction expenditures over and above those necessary to build the gas-fired capacity. These expenditures would come at a sacrifice of 500,000 to one million jobs which investment of the $44 billion could have created in other sectors of the economy.

In addition, the FUA's encouragement of coal consumption could cause $7 billion worth of damage to the environment by the year 2000, according to the Urban Institute study. This works out to a $120 loss for the average family of four. Such a loss could take the form of increased pollution cleanup costs, decreased environmental quality, or some combination of the two. The FUA could increase sulfur dioxide emissions by 2 billion pounds, a five percent increase; raise nitrogen oxide emissions by 600 million pounds, a 1.5 percent increase; and create 100 billion extra pounds of sludge and ash. These figures assume that the legislation is enforced no more stringently in the future than it is now.

There are additional costs which are more difficult to measure. At year-end 1986, projects representing as much as 350 billion cubic feet of additional gas demand awaited Department of Energy approval. Approval takes five months to a year, delaying new construction by at least that length of time. The exemption process imposes monetary costs as well. One gas industry spokesman has stated that the cost of simply preparing an exemption request can top $100,000.

Of course, taxpayers must also fund the bureaucracy responsible for evaluating these exemptions. Third parties can further delay approval and raise utility, industry, and government costs by intervening in the exemption process. And while suppliers of competing fuels may feel they benefit by intervening, the money they spend to defend their private interests can be regarded as pure waste from the point of view of the rest of society. In addition, the very knowledge that one must run the exemption gauntlet likely diminishes public utility and other business executives' alertness to cost-effective opportunities to employ gas.

Some of the FUA's proponents seek to enhance America's energy security by encouraging use of coal rather than natural gas and oil. Like the term "national security," "energy security" is unfortunately too often used as a blanket excuse to cover otherwise devious deeds. The argument rings particularly hollow in this case.

First of all, the FUA's principal effect is to diminish consumption of natural gas, not oil. But America does not depend on potentially hostile overseas powers for natural gas supplies. Most natural gas is domestic, and the principal nondomestic sources are Canada and Mexico.

Second, the new "combined cycle" technology which promises to alter the economics of power plant construction can generate electricity from natural gas or gas produced from coal. Utilities and others can construct the gas-burning part of the plant now, then build a coal gasification plant later if or when gas prices rise to a level which makes coal gasification an economical alternative. "Energy efficiency" does not just mean being prepared to use alternative fuels. It also means refraining from using them until they are the least expensive option.

Finally, some have implied that forcing utilities and others to burn coal, or at least build boilers which can burn coal without first turning it into gas, will promote development of new, cleaner, less costly methods of burning coal, and hence make coal more competitive with other fuels. This kind of argument, however, is backwards. What it really implies is that the way to make coal more competitive with other fuels is to shield it from competition through measures such as the Fuel Use Act, giving coal a "semi-monopoly," in effect, in some segments of the fuel market. If Congress is truly interested in promoting coal use, it should ensure that coal faces vigorous competition from other fuels. Only then will coal producers and consumers have the maximum incentive to find newer and better ways to utilize America's most plentiful fossil fuel.

Of course, the Fuel Use Act is only one element in a large bundle of natural gas issues. Incremental pricing too restricts gas use and forces pipelines to divide up fixed capital costs among a smaller number of gas buyers. The Federal Energy Regulatory Commission's statutory authority to regulate old natural gas prices survives as a worrisome precedent for future price controls. Transportation of gas from wellhead to customer remains a vexing issue.

CSE would prefer a comprehensive solution to these problems rather than a piecemeal approach. But whichever approach Congress takes, it is important that members realize the profoundly anti-consumer nature of the Fuel Use Act.

The American Waterways Operators, Inc.

Executive Offices

1600 Wilson Boulevard
Suite 1000
Arlington, VA 22209

Tel. 703 841-9300

Joseph Farrell
President

March 20, 1987

Honorable J. Bennett Johnston
Chairman, Energy and Natural Resources
Committee
United States Senate
Washington, D.C. 20510

Dear Mr. Chairman:

The American Waterways Operators (AWO), representing the domestic barge and towing industry, wishes to comment for the hearing record on your bill, S. 85, repeal of the Powerplant and Industrial Fuel Use Act (PIFUA), specifically those provisions which would repeal the coal capability requirements for new powerplants.

The barge industry transports approximately 160 million tons of coal annually; roughly 35 million tons shipped on the waterways is "coal-capability"-dependent, according to National Coal Association estimates. While there has been a modest increase in recent months in the amount of coal transported by barge, overall tonnages figures have dropped significantly over the past four to five years. Elimination of the coal capability requirement would have a devastating effect on the coal-hauling segment of the domestic waterways industry.

More importantly, looking beyond the needs of our membership to the needs of our nation, I believe it would be unsound public policy to repeal the coal capability requirements of PIFUA. We need only look back to the '70s to remind ourselves of the dependency this great country has on the Middle East oil supplies. In fact, Secretary of the Interior Donald P. Hodel has been widely quoted in recent weeks warning that gas lines will return in two to five years. The volatility of international politics makes it imperative that, in the name of energy security, the current coal capability requirements are retained.

Thank you for your consideration of our comments.

Sincerely,

Joseph Farrell

JF:vp

cc: Members, Senate Energy and Natural Resources Committee

The Barge and Towing Industry Association

PMAA

PETROLEUM MARKETERS ASSOCIATION OF AMERICA
1120 VERMONT AVE., NW • SUITE 1130 • WASHINGTON, DC 20005 • (202) 331-1198

March 24, 1987

The Honorable Howard M. Metzenbaum, Chairman
Subcommittee on Energy Regulation and Conservation
Committee on Energy and Natural Resources
United States Senate
Washington, D.C. 20510

Dear Mr. Chairman:

On behalf of the Petroleum Marketers Association of America (PMAA), I ask that these comments supporting repeal of the Fuel Use Act (FUA) be included in the record in connection with your March 12 Subcommittee hearing.

PMAA is a national federation of 41 state and regional trade associations representing 11,000 marketers of petroleum products. While almost all of these marketers are small businessmen, collectively they sell over half the gasoline and three-quarters of the heating oil consumed in this country.

PMAA advocates an energy marketplace where different fuels can compete without government intervention. The FUA, with its requirement that existing major industrial plants stop using fuel oil and natural gas, and its outright ban on fuel oil and natural gas use by new electrical generating and industrial plants, discourages competition in the energy marketplace.

The Fuel Use Act has long been identified as one of the regulatory restrictions that could be lifted in order to stimulate the depressed petroleum producing industry in this country. Repeal of the FUA will contribute to a stronger domestic producing industry, which PMAA believes is in the nation's best interest.

For these reasons, PMAA supports legislation such as S. 85, the Natural Gas Utilization Act of 1987, because it repeals the FUA. PMAA does not support proposals that would mandate "coal capability" in powerplants. Coal capability would work against the aims of legislation such as S. 85, that is, eliminating energy use restraints to provide facility managers with the flexibility to select the most competitive fuel.

Thank you for you consideration. If there are any questions regarding this matter, please have your staff contact me or Al Cobb, PMAA's Director of Legislative and Political Affairs.

Sincerely,

Dick Cahoon

C. Richard Cahoon
Vice President for Policy

CRC:cp
cc: Members of the Committee on Energy and Natural Resources

Formerly National Oil Jobbers Council